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## THESIS

A STATISTICAL ANALYSIS OF VENEZUELAN DEFENSE  
SPENDING

by

Thomas P. Wemyss

March, 1985

Thesis Advisor:

Robert E. Looney

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A Statistical Analysis Of Venezuelan Defense Spending

by

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Lieutenant, United States Navy  
B.A., Chapman College, 1978

Submitted in partial fulfillment of the  
requirements for the degree of

MASTER OF ARTS IN NATIONAL SECURITY AFFAIRS

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## ABSTRACT

Venezuelan military expenditures have been studied many times. Relatively few of these studies have examined the patterns of government spending policies in terms of the amount and share of government budgets allocated to defense. This thesis was undertaken to prove a reliable, systematic method for the purpose of predicting future Venezuelan defense expenditures can be made with the sole use of economic factors as variables.

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## I. INTRODUCTION

### A. NATURE OF THE PROBLEM

Venezuelan military expenditures have been studied many times. Few of these studies have produced any reliable estimates for future predictions. This thesis was undertaken to prove a reliable, systematic method for the purpose of predicting future Venezuelan defense expenditures can be made with the sole use of economic factors as variables.

An initial data base of economic variables for 96 countries was utilized. Factor analysis of these variables was performed to show major trends. Discriminate analysis was conducted in order to divide the countries into two groups. A multiple regression analysis model was used for the group containing Venezuela to determine the correlation coefficients of the economic variables to Venezuelan defense expenditures.

## II. HISTORY OF VENEZUELA

Venezuela is situated on the northern coast of South America, bordered by Columbia on the West, Brazil on the South, and Guyana on the East. Venezuela was discovered in 1498 by Columbus on his third voyage. Venezuela, along with what are now Columbia, Panama, and Ecuador revolted against Spain in 1810. In 1821 they gained their independence and formed the "Great Columbia" union. In 1830 the "Great Columbia" union separated and Venezuela began its own existence as a sovereign state.

Throughout the remainder of the 19th century, Venezuela was characterized by frequent periods of political instability, dictatorships and revolutionary turbulence. The beginning of the 20th century for Venezuela was marked with continued dictatorship but also by a growing awareness of the value of the country's natural resources.

Although small in size and population, Venezuela has large deposits of natural resources. The most abundant of its natural resources is petroleum. Drilling for Venezuelan petroleum began as early as 1886 by Guzman Blanco. By 1912 Blancos Company was producing only sixty barrels of crude oil daily and was forced to dissolve [Ref. 1: p. 4]. This was a sputtering start

for an industry that was to play such a major part in the economic development of Venezuela.

Rafael Max Valladares, a citizen of Venezuela, is often said to be the man responsible for the first foreign investment in Venezuela oil exploration. He signed a contract in 1910 giving him the rights to explore and develop the Paria peninsula, Benitez district in Sucre state, Pedernales, and the nearby islands in the Orinoco delta. The life of the contract was forty-seven years. Four days later, Valladares transferred the contract to the Bermudez Company. The Bermudez Company, based in Philadelphia, was an affiliate of General Asphalt which had unprofitable relations with Venezuela earlier.

Two years later, Valladares signed another contract with the Venezuelan government. He again used bribery to exploit the corruption in government in order to obtain valuable concessions. He received the rights to explore and develop the subsoil of Sucre, Monagas, Anzoategui, Nueva Esparta, Truillo, Merida, Zulia, Lara, Falcon, Carabobo, and Yaracuny. This enormous area covered 27 million hectares (about 68 million acres) [Ref. 1: p. 14]. Two days after signing the contract, Valladares sold the contract to another General Asphalt affiliate, the Caribbean Petroleum Company.



The contract was in clear violation of Venezuela law. Under the Venezuela mining laws, the maximum area that could be granted was 800 hectares. Clearly the Valladares contract for 27 million hectares was in direct violation of this law. No protests were lodged against Valladares by one, single, Venezuelan. Charges were later brought against Valladares by an American and an Englishman. Corruption and bribery were again on Valladares side when the Venezuelan Supreme Court ruled that the mining law restricting area concessions to 800 hectares was unconstitutional.

The door was now open for larger area grants to be explored for petroleum. Large numbers of bidders for the Venezuelan subsoil rights descended hungrily upon the country. Foreign investment in Venezuela soared. The British were among the first to stake thier claims in the northwest coastal area and in the Orinoco delta. American capital in Venezuelan oil development did not arrive until several years later.

Standard Oil had concentrated on controlling the production of petroleum in only the United States. It took World War I to show Standard Oil the importance of large petroleum reserves during a conflict. With the United States oil reserves seriously depleted after World War I, Standard Oil and other U.S. companies with vast capital resources, entered the field of oil

exploration in Venezuela. Investments by United States companies in Venezuelan oil explorations grew by leaps and bounds:

---

| <u>Year</u> | <u>U.S. Investments In Venezuela</u> |
|-------------|--------------------------------------|
| 1924        | \$11 Million                         |
| 1925        | \$72 Million                         |
| 1926        | \$128 Million                        |
| 1928        | \$157 Million                        |

---

Figure 1 - U.S. Investments In Venezuelan Oil Production

The Venezuelan oil industry grew, but not without legal battles and continued corruption. Standard Oil and Royal Dutch Shell often lodged protests against each other over territorial rights. A truce was finally reached between these two large investors in 1929. It was an "As Is" agreement, each agreeing to keep off the territory of the other.

The corruption in the oil industry continued for many years. The then President of Venezuela, Juan Vincente Gomez, and his Ministers made illegal and

unethical concessions to the foreign oil companies in exchange for money. Gomez and his Ministers used the oil concessions as if it were a matter of personal wealth, not a matter of State wealth.

By 1936 Venezuela had become a major, world exporter of petroleum but exported little else. In 1936 petroleum accounted for 85% of Venezuelan exports. Land that had once been a major producer of cacao now sat idle. Harvest of cacao was at a minimum as the rural areas generally became impoverished. Ranches and haciendas were foreclosed by banks and loan offices. Much of the income from petroleum went into the hands of government officials and not to the State where it could have been used to improve education and diversify the private industry into areas other than petroleum.

An Oil Reform law was passed in 1943 by the Venezuelan Congress. Although it favored the oil companies, it did improve State income through an increase in oil taxes.

Late in 1945, there was a successful revolutionary coup. The coup was headed by the Accion Democratica party and young members of the military. The revolution had been sparked by an increase in public awareness of the corruption in the Venezuela government.

After the revolution, the ruling junta strived to restore law and order, and to establish a Democratic ruling government.

#### A. REVISED PETROLEUM TAX

The revolutionary government decreed an extraordinary tax on December 31, 1945. The decree affected only taxpayers of that year with an income of more than Bs. 800,000. It affected a total of 75 persons or business entities of the 20,000 in the country which paid income taxes. Additional tax funds of Bs. 93,381,775 were collected, of which 98.5% came from the oil companies. The justification for the new tax was based on solid arguments. The old 1943 oil bill called for Venezuela to receive an amount equal to half of the industries' earnings. The new tax insured this [Ref. 3: p. 986].

On October 27, 1946, the first democratic elections were held in Venezuela. Over 36% of the population turned out to cast thier ballots. The voters elected 160 delegates to the National Constituent Assembly [Ref. 1: p. 113].



---

| <u>Party</u>                  | <u>Number Of Delegates</u> |
|-------------------------------|----------------------------|
| Accion Democratica            | 137                        |
| COPEI                         | 19                         |
| Union Republicana Democratica | 2                          |
| Partido Comunista             | 2                          |
|                               | <hr/>                      |
| Total Delegates               | 160                        |

---

Figure 2 - National Constituent Assembly Elections -1946

The objectives of the new administration were both to attend to the immediate national needs, and to give a more permanent solution to the fundamental problems of the country.

The Constituent Assembly ratified a new Constitution on July 5, 1947. This constitution was described by Professor Austin F. Macdonald, of the University of California, as "The most democratic document in the history of the Venezuelan nation" [Ref. 2: p. 430]. The Accion Democratica party also strived to restore honesty and prestige to those in public service.

A new law called the Illegal Enrichment of Public Officials was signed into law October 18, 1948. This

required all government employees to make public sworn declarations of thier assets upon entering and leaving office.

#### B. ELIMINATION OF UNEMPLOYMENT AND LOW SALARIES

More jobs were created in the oil industry for Venezuelans. Employment of Venezuelans in the oil industry grew to 52,924 in 1947 and to 68,418 in 1948. The number of Venezuelans participating in the Social Security System grew from 57,333 in 1944 to 77,842 in 1948 [Ref. 5]. Oil production in Venezuela also increased.

---

#### Year Million Barrels Percentage Of 1938 Production

|      |     |      |
|------|-----|------|
| 1938 | 180 | 100% |
| 1945 | 323 | 172% |
| 1946 | 388 | 216% |
| 1947 | 435 | 242% |
| 1948 | 475 | 264% |

---

Figure 3 - Venezuelan Oil Production 1938-1948

Venezuelan oil workers received a 75% pay raise between 1946 and 1948 largely due to labor union

negotiations with the oil companies. They also received Sundays off with pay, and a fifteen day paid vacation each year [Ref. 4].

---

|                          | Increase    |              |             |              |
|--------------------------|-------------|--------------|-------------|--------------|
|                          | Bs.1946     | Bs.1948      | Bs.         | %            |
| Average Basic Daily Wage | 12.9        | 17.38        | 4.48        | 34.7         |
| Other Cash Payments      | <u>3.8</u>  | <u>13.02</u> | <u>9.22</u> | <u>242.6</u> |
| Total Daily Wages        | 16.7        | 30.4         | 13.7        | 82.0         |
| Indirect Benefits        | <u>6.38</u> | <u>12.08</u> | <u>5.72</u> | <u>89.9</u>  |
| Total                    | 23.06       | 42.48        | 19.42       | 84.2         |

---

Figure 4 - Venezuelan Oil Workers' Wages 1946-1948

#### C. PROVIDE ADEQUATE AMOUNTS OF FOOD AT AN AFFORDABLE COST

The availability and consumption of food in Venezuela was well below that recommended by a federal conference held at Hot Springs [Ref. 6]. The government intervened to increase food imports to be distributed through commercial channels at a price lower than the import cost. In 1945, food imports were valued at Bs. 63,146 million. In 1948, they totaled Bs. 374,920, an increase of almost 500% [Ref. 1: p. 162].

---

| <u>Food</u>               | <u>1943 Consumption</u> | <u>Minimum Need</u> |
|---------------------------|-------------------------|---------------------|
| Flour, Rice, Cereals      | 265,265 Tons            | 292,560 Tons        |
| Cheese, Butter, Milk      | 248,465                 | 467,760             |
| Meat And Fish             | 81,655                  | 120,720             |
| Eggs                      | 14,400                  | 33,240              |
| Vegetable Oils            | 30,759                  | 37,680              |
| Fats                      | 9,769                   | 19,920              |
| Citrus Fruits And Tomatos | 65,265                  | 117,360             |
| Vegetables, Potatos, Etc. | 76,725                  | 440,640             |

---

Figure 5 - Food Needs Vs. Actual 1943 Consumption

#### D. INCREASE INDUSTRIAL SECTORS EARNINGS

By 1945 some industrialists and merchants were on the verge of bankruptcy. The increase in the purchasing power of the workers along with the government's policy of credits to industry were instrumental in the recovery of these firms and the establishment of numerous others. The number of business firms in the Federal District increased from 10,919 in 1947 to 12,910 by 1948 [Ref.5].

## E. INCREASE PRODUCTION OF MEAT AND MILK

A very prosperous cattle industry had once existed in Venezuela. By 1945 it had so declined, it was threatened with extinction. Only 2.8 million head of cattle grazed in the pastures while 7 million head of cattle were required to supply enough meat for the populace. The government now assumed the responsibility of promoting cattle raising and milk production.

The Ministry of Agriculture and the Venezuelan Development Corporation worked closely together formulating a viable program. The plan included technical supervision of credits, the importation of cattle to breed with Venezuelan cattle, the provision of water for cattle through well-drilling and construction of reservoirs, and the prevention of cattle diseases. In 1947, more than Bs. 35 million was invested by the government in this program. This produced 100 water wells, 65 reservoirs, and hundreds of imported bulls [Ref. 1: p. 169].

## F. INCREASE AGRICULTURAL PRODUCTION

For years, many forests in Venezuela had been completely destroyed. In some parts of the country this had caused massive erosion, leaving land that was once

fertile, unfit to till. The government established the Forest Ranger Service in an attempt to end this destruction.

In 1946, 800,000 hectares were under cultivation with only 110,000 hectares having permanent irrigation systems. Irrigated land provided a better crop-yield per hectare and produced three crops a year vice one for unirrigated land. Only 700 agricultural machines were available to farm the land. Irrigation and mechanization were deemed imperative to improve production.

In its first two years in office, the government built irrigation channels for 20,000 hectares of land and imported 2,000 agricultural machines to help harvest the crops. The increase in agricultural production was impressive [Ref. 7].



---

|         | <u>1945</u>    | <u>1948</u>    |
|---------|----------------|----------------|
| Sugar   | 1,950,000 Tons | 2,370,000 Tons |
| Peas    | 8,000          | 16,000         |
| Beans   | 8,000          | 18,017         |
| Potatos | 9,185          | 16,000         |

---

Figure 6 - Venezuelan Production In Metric Tons Of Diet Staples

#### G. EDUCATION REFORM

Simon Bolivar once said, "The ignorance of the people is the instrument of their own destruction". This had certainly been true of Venezuela. In 1941, Venezuela had 2 million citizens older than 15 years of age. 1.3 million, or 75 percent of them were illiterate. An aggressive program was undertaken to provide Venezuelans with a better education.

Between 1945 and 1948 attendance at primary schools increased by 78 percent. Attendance at secondary schools increased by 91 percent. The number of teachers was increased by 62 percent and the number of schools almost doubled. The junta was making a frontal attack on illiteracy in Venezuela [Ref. 1: p. 210].

---

|                                 | <u>1945</u>   | <u>1948</u> |
|---------------------------------|---------------|-------------|
| Ministry Of Education           | Bs.38 Million | Bs.119      |
| Budget                          |               |             |
| Primary School Enrollment       | 281,000       | 500,000     |
| Secondary School Enrollment     | 11,598        | 22,000      |
| Teachers                        | 8,250         | 13,500      |
| Percentage Of Illiterate Adults | 75%           | 56%         |

---

Figure 7 - Venezuelan Educational Reform Report - 1948

#### H. A STEP BACKWARDS

A successful military coup d'etat, headed by Colonel Carlos Delgado Chalbaud occurred on November 24, 1948. The political regime in which the Venezuelan people had placed their trust and hope was gone, many of its officials in jail. As in pre-1945 dictatorships, corruption in the new military ruling party was rampant. Chalbaud was assassinated in 1950 and a military junta, headed by Colonel Marcos Pirez Jimenez took charge. The junta promised general elections but took thier time before holding them. The elections were held on November 30, 1952.

The elections and events immediately preceeding the elections can best be described through the reports of international news agencies. As described by the Economist of London, December 11, 1952:

The elections on November 30 were impressive in their orderliness. Secrecy of the ballot was observed and more than 80 percent of the electorate voted. The two opposition parties allowed to function legally, the left-of-center URD and the Catholic Copei had no criticism of the voting. As the first results came in URD was getting 54 percent of the votes, Copei 15 percent and the FEI, the government party, only 25 percent [Ref. 8].

Local radio stations had been transmitting election bulletins that revealed a solid defeat of the dictatorship. The entire world knew by the next day that the opposition had won the election.

On December 1, the transmission of news from Venezuela to the outside world was suddenly interrupted by censorship. Local radio stations were occupied by police and were only permitted to transmit music and commercial announcements. On December 2, with the support of six chiefs of the armed forces, Colonel Perez Jimenez proclaimed himself provisional president. As described by the New York Times:

What happened in Venezuela these last few days comes as a shock to all who cherish the growth of democracy in Latin America. The shock is no less great because the leader of the military junta, Colonel Perez Jimenez, appears to have done just what everyone expected. He took several years to arrange an election for a constituent assembly, thought he had it sewed up, and then, when - according to the only credible figures - he saw that

he was losing, he reacted in the old-fashioned way and is retaining power by force.

This is not the way that he and his supporters explain what happened. According to them, the electoral tide, which was running at two and a half to one against them for at least one-third of the votes, took a sudden turn and gave the Government group (the FEI) a numerical superiority. Thereupon - although even the total claimed by the clique represented less than 30 percent of the electorate - Perez Jimenez, "by decision of the armed forces," proclaimed himself provisional president. Yet, according to the electoral law which the junta itself drew up, the constituent assembly was to choose the provisional president on Jan 10 [Ref.9].

The road that was to have been opened by popular election for constitutional government remained closed. From 1953 to 1958 Perez Jimenez imposed a strict dictatorship on the country. The wealth of the country brought increased prosperity for a few, namely the dictator and his associates. The common Venezuelan saw a decrease in his standard of living and his freedoms. Some social programs were reduced while others were eliminated.

The freedom for unions to organize and to bargain for better wages and working conditions was taken away from the Venezuelan people. The workers and peasants had lower living standards than in 1948. The real value of the workers' wages can be shown as their purchasing power, as determined by the cost-of-living index [Ref. 10].

---

| Year | Avg.<br>Daily Wage | Percentage<br>Increase | Cost-Of-<br>Living Index | Real<br>Wage | Real<br>Increase |
|------|--------------------|------------------------|--------------------------|--------------|------------------|
| 1945 | 7.15               | -                      | 100                      | 7.15         | -                |
| 1948 | 15.11              | 111.32                 | 126                      | 11.9         | 67.7             |
| 1953 | 17.33              | 14.69                  | 148                      | 11.71        | -2.3             |

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Figure 8 - Venezuelan Workers' Wages 1945 - 1953

The situation of the primary schools as revealed in 1954 was disastrous. There were one million children in Venezuela aged seven to fourteen. Of these, only 440,747 attended school, less than half of those eligible for primary schools. The remaining 560,000 added to the growing number of illiterates. Although the birth rate in Venezuela was 75,000 children per year, their attendance in primary schools decreased [Ref. 11].

The Venezuelan dictatorship showed the same incompetence in other government activities as in education. From 1945 to 1948, the agricultural production had shown tremendous increases. This was largely due to the building of irrigation channels and the importation of agricultural machines. No irrigation

channels were built during the dictatorship until 1953, delaying any possible increase in agricultural production by at least five years.

## I. A DEMOCRACY THAT LASTS

On January 23, 1958 the armed forces, with overwhelming popular support, ousted President Perez Jimenez from government office and formed a Junta comprised of two civilians and three military officers. The junta made known their main objective was to establish a honest, democratic government. Civil liberties were restored, censorship was removed and political prisoners were released promptly. Procedures for democratic elections were established quickly. Under the election guidelines, national elections would be held every 5 years to elect the President and Members of Congress. The state legislatures, and the city councils would be directly elected. The President could be elected to only one term and could not be reelected until 10 years following the end of that term.

Elections held in December 1958 chose Romulo Betancourt, candidate of the Accion Democratica party, as President of the Republic. Under President Betancourt the government inaugurated a program to



modernize agriculture, implement industrial expansion, and provide educational opportunities for its people.

The steady growth of the manufacturing industry was a key factor in diversifying the Venezuelan economy. The average annual growth rate of manufacturing for the periods: 1955-60 was 7.7 percent, 1960-65 was 9.0 percent, 1965-70 was 4.4 percent, and 1970-73 was 7.9 percent.

The production in the textile industry increased by 221 percent between 1956 and 1970. This not only provided much needed jobs for Venezuelans but also reduced the amount of imports required. Locally manufactured goods satisfied a larger percentage of the domestic market requirement.

A paper industry was established in 1956, not only under the stimulus of import-substitutions but also to keep pace with a rapidly expanding demand. In 1957 paper production in Venezuela was 7 thousand tons. By 1964 production had increased to 135 thousand tons and in 1970 it totaled 220 thousand tons [Ref. 12].

The expansion of the steel industry marked a vital stage in the transition of the Venezuelan economy towards the industrial age. Venezuela had two resources that helped advance the steel industry, an abundance of hydroelectric power available at a low cost and large reserves of high grade iron ore. The steel production

in 1958 was 40 thousand tons. With the completion of the Orinoco steel plant in 1962, the production rose to 625 thousand tons in 1965 and to 924 thousand tons in 1972. Some of this steel was destined for the world market via exports [Ref. 13].

Venezuelan petroleum had accounted for more than half the world's exports in the immediate post-war period. It lost a substantial part of its share of the world market as a result of the rapidly increasing supplies of crude oils from the Middle East, North Africa and the Soviet Union. Venezuela's share was reduced to less than one-third by 1960 and to one-tenth in 1970. Venezuelan petroleum exports to the United States have remained stationary since the late 1950's due to restrictions on oil imports imposed by the United States. The combined action of these factors account for the fact that Venezuelan exports, whose volume had increased by 61% in the 1950's, increased by only 25% in the 1960's. At the beginning of the 1970's, the Venezuelan government, in view of the rise in oil prices and the inadequate increases in their reserves, placed limitations on production by establishing maximum output levels below those placed by OPEC [Ref. 14].

President Betancourt was the first democratically elected president to complete his term of office. All

presidents that followed him would be democratically elected.

Raul Leoni, also of the Accion Democratica party, was elected president in 1964. In 1969, Rafael Caldera of the Comité de Organización Política Electoral Independiente (COPEI) party was elected president. His March 1969 inauguration marked the country's first peaceful transfer of power to a president from another political party. This helped to stabilize the democracy.

President Caldera was succeeded by AD's Carlos Andres Perez, a veteran party politician and former Betancourt Interior Minister. In 1979 COPEI again returned to power when Luis Herrera Campius became President.

The current administration, inaugurated in February 1984, is headed by President Jaime Lusinchi. The new administration took office while Venezuela was in its worst economic crisis in over a decade. The economic decline appears to have bottomed out.

The country is gradually adjusting to the need to live within a reduced oil income (down 30 percent since 1981) and without new foreign borrowing. Heavy short-term borrowing in 1980-81 and massive capital flight in 1982-83 had given the country two problems. One was a large short-term foreign debt and the other was declining foreign reserves. In February 1983

Venezuela implemented a dual exchange system along with import and price controls in order to halt the decline in foreign reserves. The decline has reversed and Venezuela's foreign reserves have grown to over \$12 billion. Due to the import restrictions, imports have dropped from \$13 billion in 1982 to \$6.8 billion in 1983.

The key to rebuilding confidence in the Venezuelan economy is rescheduling its massive foreign debt. The private sector's foreign debt is \$8 billion while the public sector's foreign debt is about \$27 billion. Venezuela is holding negotiations with foreign banks on the rescheduling of these debts.

#### J. DEFENSE SPENDING

The role of the military in any government, plays an important part in the design and makeup of its military forces. For many years, Venezuelan defense expenditures were based on their need for "internal defense". It was not until the late 1950's that Venezuela decided they required an "external defense". These two defense concepts vary greatly in their cost and in their allocations to particular service branches.

When the role of the Venezuelan military was confined to maintain law and order internally, the

defense expenditures were relatively small. The major appropriations were for hand guns, rifles, ammunition, and military pay. The need for, and the size, of the air force was small. This changed in the late 1950's.

Venezuela saw a need for external security when border disputes with Guyana and Columbia surfaced. The requirement for external security for Venezuela still remains today due to Cuban rebel insurgency activity. The border disputes required development of larger armed forces, organized and equipped on a more professional level, and hence considerably more expensive. The financial impact of expanding the air force and navy was particularly high. Major appropriations were for aircraft, ships, advanced schools and increased military pay. The role of the military had changed as had its cost as shown in Figures 9 and 10 [Ref. 1].

| <u>Year</u> | <u>Army</u> | <u>Navy</u> | <u>Air Force</u> |
|-------------|-------------|-------------|------------------|
| 1940        | 85.0%       | 15.0%       | -                |
| 1945        | 89.0%       | 11.0%       | -                |
| 1950        | na          | na          | na               |
| 1955        | na          | na          | na               |
| 1960        | 37.6%       | 35.2%       | 27.2%            |
| 1965        | 42.5%       | 33.3%       | 24.2%            |
| 1970        | 41.7%       | 33.3%       | 25.0%            |

Figure 9 - Services' Share Of Total Appropriations 1940-70



Note: Figures For 1950 & 1955 Are Not Available  
Values In Millions Of Bolivars (Bs)

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| Year | GDP | Expenditures  |          | Military Expenditures As: |                    |
|------|-----|---------------|----------|---------------------------|--------------------|
|      |     | Fiscal Sector | Military | % Of GDP                  | % Of Fiscal Sector |

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|      |       |       |     |     |      |
|------|-------|-------|-----|-----|------|
| 1940 | na    | 369   | 37  | -   | 10.0 |
| 1945 | na    | 581   | 46  | -   | 7.9  |
| 1950 | 11826 | 2074  | 187 | 1.6 | 9.0  |
| 1955 | 17896 | 2983  | 240 | 1.3 | 8.0  |
| 1960 | 25671 | 6147  | 467 | 1.8 | 7.6  |
| 1965 | 37925 | 7400  | 596 | 1.6 | 8.1  |
| 1970 | 49944 | 10295 | 806 | 1.6 | 7.8  |

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Figure 10 - Venezuelan Military Expenditures In Current Prices In Relation To Gross Domestic Product (GDP) And Fiscal Sector Expenditures

### III. PREVIOUS STUDIES

Given this background of socio-political developments in Venezuela, the main issue addressed by this thesis is the extent to which the pattern of Venezuelan military expenditures are unique or to the extent to which they can be explained by comparisons of the patterns of military expenditures in other developing countries.

Relatively few empirical studies have examined the patterns of government spending policies of developing countries, and in particular, the amount and share of government budgets allocated to defense. In an early study Martin and Lewis analyzed the size and composition of public expenditures and revenues of 16 countries, 10 of which can be classified as developing countries. Public expenditures were divided into current and capital expenditures, and for each group a functional classification was made. The study found that for current expenditures that wealthier countries spend more than the poorer countries relative to GNP on defense, on the public debt, on social security programs, and on food and agricultural subsidies. The relative importance of the remaining government expenditures was not related to per capita income.

The study by Martin and Lewis was one of the first empirical tests of "Wagner's Law" i.e. the existence of a positive relationship between the size of the public sector

and the level of economic development. Wagner argued that public expenditures could be divided into two categories, security and welfare, and that security expenditures were bound to increase with the growth of the "progressive" state as armies became larger and more capital-intensive. In addition, further intrastate conflict between individuals was generated by industrialization, necessitating increased police control. In a similiar manner, welfare expenditures would also increase with the level of economic development as the state gradually took on many of the private sector's former responsibilities such as education and public health [Ref. 16].

A more complete statement of Wagner's Law can be: in industrialized countries, public sector activities and expenditures grow in relative importance as real per capita income increases. According to Wagner, there are essentially three reasons to expect expanding state activity and expenditures. First, the state has to expand its administrative and protective functions because of the increasing complexity of legal relationships and communications. Second, the state has to expand its role because of the increase in general public services required by an increasingly affluent society. Third, increases in population and urbanization require higher public expenditure on law and order and economic regulation in order to maintain the efficient operation of an increasingly complex economy in

the rising frictions of urban life. Wagner also predicted an expansion of public expenditures on education and the distribution of income.

The final element in Wagner's framework is that as industrialization progresses, technological change and large scale investment expenditures require larger amounts of capital than the private sector can provide. Therefore, the state must provide the necessary capital to finance large scale investment projects.

A major test of Wagner's Law was undertaken by J. R. Lotz in 1970 [Ref. 17]. He investigated several components of public expenditures, of which defense spending was one. He performed a factor analysis of 37 developing countries (using mid-1960s cross section data) to conclude that defense spending was not closely related to the particular stage of economic development of these countries. Lotz explains this by using the hypothesis that there exists a certain minimum size for a military establishment, determined by technical factors. This implies a minimum level of defense spending regardless of the size of the national income. He stated that smaller, poorer nations have therefore been obligated to spend more than their fair share on defense because of the fear of possible mobilization of other wealthier states.

David Whynes performed a study in 1977 that was similar to Lotz's [Ref. 18]. Whynes' conclusions supported those of Lotz and Wagner's Law. The results are not particularly

strong however, suggesting one or more pertinent factors may have been excluded.

#### A. VENEZUELAN FOREIGN DEBT

In principle, foreign debt represents a liability for the borrower and also produces an asset. Unfortunately, this was often not the case for Venezuela. Some of their loans were not well invested while others were used to increase defense expenditures. As a result, the ratio of external debt-service to export goods and services rose sharply. Lower oil prices and the rise of "Capital Flight" from Venezuela added to the problem of an increasing foreign debt. By 1983 the external debt was equivalent to 47 percent of GDP. It would have required 35 percent of its exports to service the external debt [Ref. 19].

The thesis developed below is that previous attempts to explain defense expenditure patterns using cross section data have failed because they did not include a profile of external debt and the relationship between debt and the financing of defense expenditures. By incorporating external debt and the financing of defense expenditures into the cross section analysis, the study provides valuable insight into the parameters necessary for a more detailed, time series analysis of Venezuela.

The analysis will attempt to prove whether external debt will help in explaining a significant part of the pattern of defense spending in Venezuela? This analysis uses a cross section analysis consistent with Wagner's Law.



#### IV. DISCRIPTION OF ANALYSIS

##### A. FACTOR ANALYSIS

As noted in chapter III, previous studies using cross section analysis did not consider the effects revenue constraints and external financing play in government spending decisions. That such constraints exist for developing countries has been stressed by Walter Heller [Ref. 20].

In the following section an attempt will be made to gain some understanding of the effects of revenue constraint and external sources of funds on the pattern of military expenditures in our sample of developing countries. Particular attention will be given to how these factors influence defense spending in Venezuela.

The data base used for cross sectional analysis differs from those used in previous independent studies in two respects. First, the sample is much larger. The initial data base contained 96 developing countries. Second, the data base comprises both economic and socio-political variables. Economic variables were taken from the World Bank data base [Ref. 21] and the International Money Fund [Ref. 22]. The political and social indicators were taken from the Yale Data Base [Ref. 23]. The military expenditures were

taken from the U. S. Arms Control and Disarmament Agency [Ref. 24].

In order to formulate relationships between military expenditures and specify dimensions of the economy, factor analysis was used [Ref. 25]. Factor analysis allows for the patterning of several variables into a smaller number of linear combinations of the variables.

Thirty-four variables for each country were used as inputs into the factor analysis. The results of the orthogonally rotated factor pattern, Table 1, indicated that 99 percent of the observed variance in the data set could be accounted for by seven factors.

Forty countries were retained in the analysis. The remaining 56 were eliminated from the factor analysis due to necessary data not being available. The loadings of each country on the seven factors is given in Tables 2 through 8. Each factor represents a different dimension of the underlying economic debt conditions experienced by our sample of countries.

It is interesting to note that Venezuela does not always place at the high or low end of the spectrum. The same is true of the other countries. This leads to a conclusion that factor scores alone, although suggestive, are not sufficient to group countries as high or low debtors or as any other conceivable categorization based on the sample of economic variables included in one analysis. Nor is it clear from

Table 1

Orthogonally Rotated Factor Pattern: (Loadings)  
Economic Variables

| Variables                                             | Factors                                            |                                                            |                                         |                                          |                           |                                       |                                         |
|-------------------------------------------------------|----------------------------------------------------|------------------------------------------------------------|-----------------------------------------|------------------------------------------|---------------------------|---------------------------------------|-----------------------------------------|
|                                                       | 1<br>Factors<br>Eligating<br>Public<br>Consumption | 2<br>Factors<br>Contributing<br>to Public<br>External Debt | 3<br>Gross<br>International<br>Reserves | 4<br>Share of<br>Public<br>External Debt | 5<br>Growth<br>in Exports | 6<br>External<br>Debt Service<br>1982 | 7<br>Public<br>External<br>Debt<br>1982 |
| Gross Inflow Public Loans/<br>Exports 1982            | 97*                                                | 0                                                          | -14                                     | 8                                        | 2                         | -9                                    | 5                                       |
| Public Debt/ Exports 1982                             | 96*                                                | 3                                                          | -13                                     | 2                                        | -4                        | -13                                   | -6                                      |
| Resource Balance as % of GDP 1982                     | 94*                                                | 11                                                         | 1                                       | -14                                      | 7                         | 7                                     | 7                                       |
| Growth in Public Consumption<br>1970-82               | 92*                                                | 3                                                          | -5                                      | 4                                        | 26                        | -7                                    | 2                                       |
| Public External Borrowing<br>Commitments/Exports 1982 | 91*                                                | -4                                                         | -13                                     | 8                                        | 12                        | -11                                   | 23                                      |
| Gross Inflow Public Loans/GDP 1982                    | 86*                                                | 7                                                          | -8                                      | -2                                       | -11                       | -13                                   | -25                                     |
| Public Consumption as % of GDP 1982                   | 63*                                                | -5                                                         | -9                                      | 55                                       | -13                       | -5                                    | 27                                      |
| Growth in Private Consumption<br>1970-1982            | 62*                                                | 12                                                         | 10                                      | 1                                        | 48                        | 8                                     | 2                                       |
| Private Consumption as % of GDP 1960                  | -72*                                               | 7                                                          | -15                                     | -16                                      | 1                         | -13                                   | -44                                     |
| Private Consumption as % of GDP 1982                  | -82*                                               | -15                                                        | -16                                     | -28                                      | -11                       | -19                                   | -10                                     |
| Terms of Trade 1982                                   | -83*                                               | 21                                                         | 21                                      | 9                                        | 10                        | 17                                    | -5                                      |
| Total Public External Debt 1982                       | 0                                                  | 94*                                                        | 11                                      | 0                                        | 20                        | 20                                    | -4                                      |
| Gross Inflow Public Loans 1970                        | 14                                                 | 92*                                                        | 20                                      | -7                                       | -18                       | -7                                    | 9                                       |
| Interest Payments on External<br>Debt 1970            | 9                                                  | 90*                                                        | 13                                      | -16                                      | -20                       | 2                                     | -10                                     |
| Repayment of Principal on Public<br>Loans 1982        | 4                                                  | 89*                                                        | 10                                      | -11                                      | -15                       | 12                                    | -17                                     |
| Gross Inflow Public Loans 1982                        | -5                                                 | 86*                                                        | 10                                      | 1                                        | 29                        | 28                                    | -11                                     |
| Public External Borrowing<br>Commitments 1982         | -6                                                 | 85*                                                        | 14                                      | -4                                       | 34                        | 18                                    | -4                                      |
| Interest Payments on External<br>Debt 1982            | -6                                                 | 82*                                                        | 6                                       | 2                                        | 30                        | 39                                    | -4                                      |
| Total Public External Debt 1970                       | 15                                                 | 80*                                                        | 12                                      | -14                                      | -23                       | -10                                   | 10                                      |
| Net Inflow of Public External<br>Loans 1970           | 19                                                 | 77*                                                        | 23                                      | -2                                       | -17                       | -19                                   | 25                                      |
| Repayment of Principal on External<br>Loans 1982      | -4                                                 | 73*                                                        | 21                                      | 5                                        | 31                        | 31                                    | 7                                       |
| Growth in Exports 1970-82                             | -2                                                 | 37*                                                        | 25                                      | 3                                        | 5                         | -8                                    | -36                                     |
| Current Account Balance 1970                          | 15                                                 | -80*                                                       | -1                                      | -6                                       | -29                       | 1                                     | 10                                      |
| Gross International Reserves<br>1982                  | -8                                                 | 12                                                         | 89*                                     | -11                                      | 9                         | -7                                    | 9                                       |
| Gross International Reserves<br>1970                  | -8                                                 | 29                                                         | 85*                                     | -5                                       | -7                        | 1                                     | -6                                      |
| Average Maturity of Public<br>External Debt           | 23                                                 | -18                                                        | -42*                                    | 5                                        | -11                       | -43                                   | 23                                      |
| Current Account Balance 1982                          | 13                                                 | -26                                                        | -54*                                    | 10                                       | -22                       | 0                                     | 21                                      |
| Public External Debt as % of GDP<br>1982              | 2                                                  | -9                                                         | -29                                     | 76*                                      | -15                       | 12                                    | 17                                      |
| Exports as % of GDP 1982                              | -8                                                 | -8                                                         | 7                                       | 76*                                      | 4                         | 22                                    | 5                                       |
| Growth in Exports 1960-1970                           | 8                                                  | 2                                                          | -6                                      | 67*                                      | 7                         | -27                                   | -24                                     |
| Public Consumption as % of GDP<br>1960                | 47                                                 | -11                                                        | -12                                     | 55*                                      | 20                        | -18                                   | 37                                      |
| Growth in Imports 1970-82                             | 36                                                 | -18                                                        | 19                                      | -1                                       | 71*                       | -6                                    | 1                                       |
| External Debt Service as % of GDP<br>1982             | -8                                                 | 27                                                         | -7                                      | 5                                        | -6                        | 59*                                   | 7                                       |
| Public External Debt as % of GDP<br>1970              | 50                                                 | 0                                                          | -23                                     | 20                                       | 5                         | -1                                    | 55*                                     |

Note: All military variables together with Gross Domestic Product and per capita income are omitted.

Table 2

Country Factor Scores For Factor 1:  
Factors Facilitating Public Consumption

|     |                    |         |
|-----|--------------------|---------|
| 1.  | Ecuador            | -2.4890 |
| 2.  | Greece             | -2.2314 |
| 3.  | Chad               | -1.5948 |
| 4.  | Bolivia            | -1.2513 |
| 5.  | Philippines        | -0.9176 |
| 6.  | Peru               | -0.8290 |
| 7.  | Costa Rica         | -0.8130 |
| 8.  | Ghana              | -0.7771 |
| 9.  | Indonesia          | -0.7387 |
| 10. | Thailand           | -0.7264 |
| 11. | Paraguay           | -0.6062 |
| 12. | Cent. African Rep. | -0.3525 |
| 13. | Chile              | -0.3499 |
| 14. | Mauritania         | -0.3401 |
| 15. | Panama             | -0.2948 |
| 16. | Malaysia           | -0.2398 |
| 17. | Tunisia            | -0.2020 |
| 18. | Zambia             | -0.1940 |
| 19. | Korea              | -0.1934 |
| 20. | Israel             | -0.1797 |
| 21. | Spain              | -0.1589 |
| 22. | Ethiopia           | -0.1538 |
| 23. | Mexico             | -0.1269 |
| 24. | Venezuela          | -0.0653 |
| 25. | El Salvador        | 0.0479  |
| 26. | Rwanda             | 0.1129  |
| 27. | Argentina          | 0.1188  |
| 28. | Colombia           | 0.1393  |
| 29. | India              | 0.2503  |
| 30. | Guatemala          | 0.2876  |
| 31. | Nigeria            | 0.3075  |
| 32. | Algeria            | 0.3260  |
| 33. | Uruguay            | 0.5893  |
| 34. | Sudan              | 0.6179  |
| 35. | Jamaica            | 0.6553  |
| 36. | Dominican Republic | 0.8972  |
| 37. | Malawi             | 1.2501  |
| 38. | Ivory Coast        | 1.5882  |
| 39. | Mali               | 3.5955  |
| 40. | Pakistan           | 4.8531  |

Table 3

Country Factor Scores For Factor 2:  
Factors Contributing To 1982 External Debt

|     |                    |         |
|-----|--------------------|---------|
| 1.  | Ecuador            | -7.2788 |
| 2.  | Greece             | -5.2601 |
| 3.  | Bolivia            | -3.2939 |
| 4.  | Chad               | -3.1120 |
| 5.  | Ghana              | -2.3874 |
| 6.  | Costa Rica         | -2.2553 |
| 7.  | Philippines        | -2.1711 |
| 8.  | Panama             | -1.9885 |
| 9.  | Peru               | -1.9263 |
| 10. | Thailand           | -1.8878 |
| 11. | Paraguay           | -1.4533 |
| 12. | Spain              | -0.8909 |
| 13. | Mali               | -0.8001 |
| 14. | Mauritania         | -0.7809 |
| 15. | Malaysia           | -0.7651 |
| 16. | Zambia             | -0.6972 |
| 17. | Tunisia            | -0.4030 |
| 18. | Rwanda             | -0.3004 |
| 19. | Chile              | -0.2683 |
| 20. | Cent. African Rep. | -0.0380 |
| 21. | Ethiopia           | 0.2070  |
| 22. | Indonesia          | 0.2639  |
| 23. | Pakistan           | 0.8766  |
| 24. | Venezuela          | 1.0693  |
| 25. | Colombia           | 1.1655  |
| 26. | El Salvador        | 1.1777  |
| 27. | Korea              | 1.2816  |
| 28. | Guatemala          | 1.3695  |
| 29. | Algeria            | 1.4794  |
| 30. | Jamaica            | 1.4931  |
| 31. | Sudan              | 1.5025  |
| 32. | Israel             | 1.5378  |
| 33. | Argentina          | 1.6393  |
| 34. | Uruguay            | 1.8396  |
| 35. | Dominican Republic | 1.9734  |
| 36. | Nigeria            | 2.1722  |
| 37. | India              | 3.3307  |
| 38. | Malawi             | 3.3971  |
| 39. | Ivory Coast        | 4.0038  |
| 40. | Mexico             | 4.6507  |

Table 4

Country Factor Scores For Factor 3:  
Gross International Reserves

|     |                    |         |
|-----|--------------------|---------|
| 1.  | Mali               | -1.3833 |
| 2.  | Sudan              | -1.3014 |
| 3.  | Cent. African Rep. | -1.1758 |
| 4.  | Ethiopia           | -1.1215 |
| 5.  | Jamaica            | -0.9842 |
| 6.  | Rwanda             | -0.9074 |
| 7.  | Mauritania         | -0.8214 |
| 8.  | Guinea             | -0.7378 |
| 9.  | Uruguay            | -0.7286 |
| 10. | El Salvador        | -0.7281 |
| 11. | Guatemala          | -0.6881 |
| 12. | Chad               | -0.6759 |
| 13. | Pakistan           | -0.6004 |
| 14. | Paraguay           | -0.5945 |
| 15. | Costa Rica         | -0.5353 |
| 16. | Mali               | -0.5090 |
| 17. | Ecuador            | -0.5034 |
| 18. | Panama             | -0.4762 |
| 19. | Tunisia            | -0.4503 |
| 20. | Bolivia            | -0.3492 |
| 21. | Ivory Coast        | -0.2372 |
| 22. | Mexico             | -0.0828 |
| 23. | Dominican Republic | -0.0602 |
| 24. | Nigeria            | 0.1027  |
| 25. | Peru               | 0.2230  |
| 26. | Philippines        | 0.3535  |
| 27. | Zambia             | 0.3978  |
| 28. | Korea              | 0.4096  |
| 29. | Chile              | 0.4503  |
| 30. | Israel             | 0.4825  |
| 31. | Indonesia          | 0.5626  |
| 32. | Colombia           | 0.6586  |
| 33. | Algeria            | 0.8570  |
| 34. | Greece             | 0.8900  |
| 35. | Malaysia           | 0.8978  |
| 36. | Thailand           | 1.0872  |
| 37. | Argentina          | 1.1156  |
| 38. | India              | 1.9638  |
| 39. | Venezuela          | 2.3875  |
| 40. | Spain              | 3.2244  |

Table 5

Country Factor Scores For Factor 4:  
Share Of 1982 External Public Debt In GDP

|     |                    |         |
|-----|--------------------|---------|
| 1.  | India              | -1.5818 |
| 2.  | Guatemala          | -1.4559 |
| 3.  | Ghana              | -1.4076 |
| 4.  | Ethiopia           | -1.3944 |
| 5.  | Sudan              | -1.1581 |
| 6.  | Colombia           | -1.0837 |
| 7.  | Venezuela          | -1.0523 |
| 8.  | Paraguay           | -1.0067 |
| 9.  | Nigeria            | -0.9689 |
| 10. | El Salvador        | -0.9331 |
| 11. | Uruguay            | -0.7912 |
| 12. | Dominican Republic | -0.7558 |
| 13. | Argentina          | -0.5884 |
| 14. | Chile              | -0.5333 |
| 15. | Peru               | -0.4784 |
| 16. | Spain              | -0.3265 |
| 17. | Malawi             | -0.3010 |
| 18. | Mexico             | -0.2499 |
| 19. | Rwanda             | -0.2259 |
| 20. | Ivory Coast        | -0.2202 |
| 21. | Indonesia          | -0.1013 |
| 22. | Pakistan           | -0.0949 |
| 23. | Cent. African Rep. | 0.0666  |
| 24. | Bolivia            | 0.0711  |
| 25. | Thailand           | 0.2233  |
| 26. | Philippines        | 0.2709  |
| 27. | Jamaica            | 0.2823  |
| 28. | Algeria            | 0.6071  |
| 29. | Tunisia            | 0.7297  |
| 30. | Zambia             | 0.7498  |
| 31. | Malaysia           | 0.7798  |
| 32. | Korea              | 0.8679  |
| 33. | Chad               | 0.9890  |
| 34. | Greece             | 1.0370  |
| 35. | Costa Rica         | 1.0955  |
| 36. | Ecuador            | 1.2952  |
| 37. | Israel             | 1.3849  |
| 38. | Panama             | 1.4027  |
| 39. | Mali               | 1.5900  |
| 40. | Mauritania         | 3.6628  |



Table 6

Country Factor Scores For Factor 5:  
Growth In Imports

|     |                    |         |
|-----|--------------------|---------|
| 1.  | Ivory Coast        | -5.0761 |
| 2.  | Malawi             | -4.8299 |
| 3.  | Uruguay            | -3.3891 |
| 4.  | Jamaica            | -3.2372 |
| 5.  | Dominican Republic | -3.1468 |
| 6.  | India              | -3.0464 |
| 7.  | Sudan              | -2.6887 |
| 8.  | Guatemala          | -2.1633 |
| 9.  | El Salvador        | -2.0154 |
| 10. | Argentina          | -1.8773 |
| 11. | Ethiopia           | -1.6182 |
| 12. | Zambia             | -1.2456 |
| 13. | Cent. African Rep. | -1.1247 |
| 14. | Pakistan           | -1.1750 |
| 15. | Nigeria            | -0.9924 |
| 16. | Israel             | -0.9019 |
| 17. | Colombia           | -0.8612 |
| 18. | Rwanda             | -0.5707 |
| 19. | Venezuela          | -0.3128 |
| 20. | Chile              | -0.0551 |
| 21. | Tunisia            | 0.3368  |
| 22. | Mauritania         | 0.3370  |
| 23. | Algeria            | 0.3126  |
| 24. | Spain              | 0.4160  |
| 25. | Ghana              | 0.7502  |
| 26. | Paraguay           | 0.9798  |
| 27. | Panama             | 1.0977  |
| 28. | Korea              | 1.2124  |
| 29. | Costa Rica         | 1.2232  |
| 30. | Mali               | 1.3330  |
| 31. | Malaysia           | 1.1502  |
| 32. | Mexico             | 1.6052  |
| 33. | Peru               | 1.6304  |
| 34. | Chad               | 1.8443  |
| 35. | Thailand           | 2.3142  |
| 36. | Indonesia          | 2.9950  |
| 37. | Bolivia            | 3.0814  |
| 38. | Philippines        | 3.7085  |
| 39. | Greece             | 6.8672  |
| 40. | Ecuador            | 9.0682  |

Table 7

Country Factor Scores For Factor 6:  
External Debt Service 1982

|     |                    |         |
|-----|--------------------|---------|
| 1.  | India              | -2.4559 |
| 2.  | Chad               | -2.2902 |
| 3.  | Pakistan           | -1.9948 |
| 4.  | Greece             | -1.8058 |
| 5.  | Philippines        | -1.4571 |
| 6.  | Mali               | -1.3548 |
| 7.  | Chile              | -1.1300 |
| 8.  | Mauritania         | -1.1084 |
| 9.  | Thailand           | -1.0292 |
| 10. | Ghana              | -0.9413 |
| 11. | Rwanda             | -0.6823 |
| 12. | El Salvador        | -0.5749 |
| 13. | Ecuador            | -0.5693 |
| 14. | Sudan              | -0.5307 |
| 15. | Indonesia          | -0.4979 |
| 16. | Bolivia            | -0.4772 |
| 17. | Guatemala          | -0.3995 |
| 18. | Cent. African Rep. | -0.2883 |
| 19. | Spain              | -0.1491 |
| 20. | Tunisia            | -0.0993 |
| 21. | Colombia           | -0.0679 |
| 22. | Israel             | 0.0199  |
| 23. | Dominican Republic | 0.1943  |
| 24. | Zambia             | 0.2192  |
| 25. | Korea              | 0.3136  |
| 26. | Jamaica            | 0.3506  |
| 27. | Ivory Coast        | 0.4902  |
| 28. | Paraguay           | 0.5343  |
| 29. | Argentina          | 0.6805  |
| 30. | Panama             | 0.9209  |
| 31. | Ethiopia           | 0.9364  |
| 32. | Venezuela          | 1.1535  |
| 33. | Malawi             | 1.1673  |
| 34. | Nigeria            | 1.2527  |
| 35. | Malaysia           | 1.2931  |
| 36. | Uruguay            | 1.3708  |
| 37. | Costa Rica         | 1.3722  |
| 38. | Peru               | 1.6916  |
| 39. | Algeria            | 1.8655  |
| 40. | Mexico             | 3.1870  |

Table 8

Country Factor Scores For Factor 7:  
Public External Debt 1970

|     |                    |         |
|-----|--------------------|---------|
| 1.  | Nigeria            | -3.5895 |
| 2.  | Ivory Coast        | -3.4609 |
| 3.  | Malawi             | -3.0665 |
| 4.  | Uruguay            | -2.9409 |
| 5.  | Dominican Republic | -2.9214 |
| 6.  | Mexico             | -1.9600 |
| 7.  | Guatemala          | -1.8860 |
| 8.  | Ethiopia           | -1.7558 |
| 9.  | Sudan              | -1.6768 |
| 10. | Argentina          | -1.4392 |
| 11. | Colombia           | -1.2397 |
| 12. | Jamaica            | -1.2197 |
| 13. | El Salvador        | -1.0996 |
| 14. | Rwanda             | -0.9080 |
| 15. | Spain              | -0.8756 |
| 16. | Forma              | -0.5777 |
| 17. | Malaysia           | -0.4251 |
| 18. | Pakistan           | -0.3813 |
| 19. | Paraguay           | -0.1949 |
| 20. | Tunisia            | -0.1760 |
| 21. | Thailand           | -0.0660 |
| 22. | Algeria            | -0.0576 |
| 23. | Mauritania         | -0.0104 |
| 24. | Cent. African Rep. | 0.0316  |
| 25. | Venezuela          | 0.3722  |
| 26. | India              | 0.4371  |
| 27. | Chile              | 0.5263  |
| 28. | Israel             | 0.5859  |
| 29. | Ghana              | 0.6319  |
| 30. | Costa Rica         | 0.9238  |
| 31. | Peru               | 1.2437  |
| 32. | Indonesia          | 1.4230  |
| 33. | Panama             | 1.4872  |
| 34. | Chad               | 2.2261  |
| 35. | Philippines        | 2.3347  |
| 36. | Bolivia            | 2.5993  |
| 37. | Zambia             | 2.7008  |
| 38. | Mali               | 4.4498  |
| 39. | Greece             | 4.5781  |
| 40. | Ecuador            | 6.4943  |

Tables 2 through 8 which factors may be of more significance in determining the level of military expenditures for Venezuela.

Michael O'Leary and William Coplin indicated in a previous study that gross national product may be the best variable to use when attempting to explain patterns of military expenditures [Ref: 26]. They found a correlation coefficient of 0.88 between military expenditures and gross national product for a sample of 19 Latin American countries for the period of 1967 to 1971.

By including total military expenditures and gross domestic product as variables in the factor analysis, Table 9 yielded some interesting but nonconclusive figures. Both variables, total military expenditures and gross domestic product, loaded highest on factor 3, the level on international reserves. Venezuela also loaded highest on factor 3, as shown on Table 4. There does not appear to be any direct correlation for the other six factors.

O'Leary and Coplin also noted that other measures, such as military expenditures as a share of gross national product, might be a more appropriate measure of the link between economic variables and military expenditures [Ref. 26].

Replacing total military expenditures with military expenditures as a share of gross domestic product however did not significantly improve the factor loading as shown in

Table 9

Oblique Rotated Factor Pattern: Economic Variables,  
Total Military Expenditure, Gross Domestic Product

| Variables                                               | Factors                     |                                    |                          |                                      |                       |                                    |              |
|---------------------------------------------------------|-----------------------------|------------------------------------|--------------------------|--------------------------------------|-----------------------|------------------------------------|--------------|
|                                                         | Overall<br>External<br>Debt | Growth in<br>Public<br>Consumption | Military<br>Expenditures | Public<br>Consumption<br>as % of GDP | External<br>Debt 1970 | Growth in<br>Public<br>Consumption | Debt<br>1982 |
| Gross Inflow Public Loans 1982                          | 99*                         | 2                                  | -3                       | 2                                    | -11                   | 12                                 | 6            |
| Interest Payment External Public<br>Debt 1982           | 90*                         | 2                                  | -6                       | 2                                    | -16                   | 10                                 | 16           |
| External Public Debt 1982                               | 94*                         | 2                                  | -2                       | 2                                    | 9                     | 8                                  | 9            |
| Repayment of Principal on Public<br>External Loans 1970 | 92*                         | 11                                 | 1                        | -5                                   | 5                     | -29                                | 0            |
| Public External Borrowing                               | 89*                         | -2                                 | -1                       | -4                                   | 0                     | 22                                 | 4            |
| Commitments 1982                                        | 83*                         | 14                                 | 5                        | -10                                  | 17                    | 28                                 | 0            |
| Interest Payment on External<br>Public Debt 1970        | 66*                         | -5                                 | 8                        | 4                                    | 11                    | 23                                 | 33           |
| Repayment of Principal on Public<br>External Loans 1982 | 65*                         | 7                                  | 7                        | -3                                   | 52                    | -7                                 | 4            |
| Gross Inflow Public Loans 1970                          | -85*                        | 19                                 | 13                       | -10                                  | -10                   | -14                                | 17           |
| Current Account Balance 1970                            | 0                           | 98*                                | -3                       | 0                                    | 2                     | 8                                  | -7           |
| Gross Inflow Public Loans/GDP 1982                      | 2                           | 97*                                | -8                       | 6                                    | 0                     | 1                                  | -2           |
| Gross Inflow Public Loans/<br>Exports 1982              | 0                           | 97*                                | -7                       | 2                                    | 3                     | 5                                  | -5           |
| External Public Debt/Exports 1982                       | 0                           | 97*                                | -10                      | 2                                    | 0                     | 5                                  | -6           |
| Public Borrowing (External)<br>Commitments/Exports 1982 | 12                          | 92*                                | 3                        | -25                                  | 0                     | 3                                  | 15           |
| Resource Balance as % of GDP 1982                       | 3                           | 89*                                | -5                       | 0                                    | -1                    | 32                                 | -9           |
| Growth in Public Consumption 1970-82                    | 17                          | -61*                               | -39                      | -12                                  | 2                     | 10                                 | -39          |
| Private Consumption as % of GDP 1970                    | -12                         | -70*                               | -20                      | -32                                  | 0                     | -9                                 | -21          |
| Private Consumption as % of GDP 1982                    | 14                          | -82*                               | 16                       | 15                                   | 13                    | 17                                 | 19           |
| Terms of Trade 1982                                     | -25                         | -9                                 | 96*                      | -8                                   | 18                    | 11                                 | 5            |
| Gross International Reserves 1982                       | 2                           | 1                                  | 96*                      | 1                                    | -10                   | -11                                | -9           |
| Gross International Reserves 1970                       | 40                          | -1                                 | 59*                      | -14                                  | 2                     | 4                                  | -16          |
| Gross Domestic Product 1982                             | 16                          | -5                                 | 58*                      | 16                                   | 39                    | 6                                  | -28          |
| Military Expenditure 1981                               | -18                         | 9                                  | -50*                     | 0                                    | 33                    | 0                                  | -23          |
| Average Maturity External Debt 1982                     | -17                         | 4                                  | -62*                     | 5                                    | 22                    | -15                                | 21           |
| Current Account Balance 1982                            | 9                           | 3                                  | -1                       | 81*                                  | -5                    | 5                                  | -51          |
| Growth in Exports 1960-70                               | 8                           | -8                                 | -25                      | 78*                                  | 0                     | -22                                | 12           |
| Public External Debt as % of GDP 1982                   | 2                           | -11                                | 15                       | 77*                                  | -16                   | -2                                 | 12           |
| Exports as % of GDP 1982                                | -17                         | 0                                  | -10                      | 68*                                  | 28                    | 16                                 | -8           |
| Public Consumption as % of GDP 1960                     | -3                          | 46                                 | 4                        | 67*                                  | 8                     | -16                                | 0            |
| Public Consumption as % of GDP 1982                     | 34                          | 3                                  | 9                        | -9                                   | 77*                   | 8                                  | 6            |
| Net Inflow Public External Loans 1970                   | 41                          | 2                                  | 10                       | -9                                   | 68*                   | -13                                | -4           |
| Public External Debt 1970                               | -5                          | -7                                 | -41                      | 12                                   | 58*                   | 8                                  | 25           |
| Public External Debt as % of GDP 1970                   | 18                          | 10                                 | 11                       | -8                                   | -2                    | 77*                                | -20          |
| Growth in Imports 1970-82                               | -1                          | 51                                 | -2                       | -3                                   | 11                    | 66*                                | 10           |
| Growth in Private Consumption 1970-82                   | 34                          | -8                                 | -24                      | 3                                    | 9                     | -12                                | 62*          |
| Debt Service as % of Exports 1982                       | 39                          | 3                                  | 21                       | 19                                   | -5                    | 0                                  | -45*         |
| Growth in Exports 1970-82                               |                             |                                    |                          |                                      |                       |                                    |              |

Table 10. In any case, Table 10 does not indicate a clear pattern of military expenditures as a major trend in the data.

The poor correlations of military expenditures on the economic trends in the data could be a result of one or both of two hypotheses: (1) political and social variables account for most of the observed patterns of military spending between countries; (2) the sample of countries is not a homogenous set with regard to underlying economic and military expenditure linkage.

A test of whether political and social variables were more prominently correlated to military expenditures was conducted using factor analysis. The input variables were selected from the Yale data set [Ref. 23]. The results showed very little correlation between the variables, disproving this hypothesis.

With regard to the second hypothesis, previous studies have stated that developing countries may lack homogeneity with respect to the decision making process for levels of defense expenditures and their impact on the overall economic growth of the country. Frederiksen and Looney contend that under certain circumstances defense spending can help the economic growth of a country while under a different set of circumstances it may hinder economic growth. Both propositions are likely to be true for the same country at different points in time [Ref. 27].

Table 10

Oblique Rotated Factor Pattern: Economic Variables,  
Military Expenditures - GNP, Gross Domestic Product

| Variables                                            | Factors                              |                                         |                                   |                                                  |                            |                                  |                               |
|------------------------------------------------------|--------------------------------------|-----------------------------------------|-----------------------------------|--------------------------------------------------|----------------------------|----------------------------------|-------------------------------|
|                                                      | 1<br>External<br>Public<br>Debt 1982 | 2<br>Growth in<br>Public<br>Consumption | 3<br>Gross<br>Domestic<br>Product | 4<br>Determinants<br>of Military<br>Expenditures | 5<br>External<br>Debt 1970 | 6<br>Growth<br>in<br>Consumption | 7<br>External<br>Debt<br>1982 |
| Gross Inflow Public Loans 1982                       | 84*                                  | 1                                       | -2                                | 1                                                | -9                         | 12                               | 7                             |
| Repayment of Principal Public Loans 1982             | 82*                                  | 10                                      | 1                                 | -5                                               | 2                          | -27                              | 2                             |
| Interest Payments External Public<br>Debt 1982       | 82*                                  | 1                                       | -4                                | 0                                                | -13                        | 10                               | 17                            |
| External Public Debt 1982                            | 81*                                  | 1                                       | -1                                | 1                                                | 8                          | 8                                | 10                            |
| Public Borrowing Commitments (External)<br>1982      | 76*                                  | -3                                      | 0                                 | -3                                               | 0                          | 21                               | 4                             |
| External Public Debt 1970                            | 75*                                  | 13                                      | 5                                 | -10                                              | 13                         | -26                              | 1                             |
| Gross Inflow Public Loans 1970                       | 61*                                  | 7                                       | 5                                 | 0                                                | 43                         | -7                               | 3                             |
| Repayment of Principal External Public<br>Loans 1982 | 55*                                  | -5                                      | 7                                 | 2                                                | 10                         | 21                               | 32                            |
| Growth in Exports 1970-1980                          | 37*                                  | 1                                       | 16                                | 22                                               | -1                         | 1                                | -35                           |
| Current Account Balance 1970                         | -75*                                 | 18                                      | 12                                | -13                                              | -9                         | -14                              | 13                            |
| Gross Inflow Public Loans Income 1982                | 0                                    | 89*                                     | -2                                | 2                                                | 2                          | 8                                | -7                            |
| Gross Inflow Public Loans/Exports 1982               | 2                                    | 89*                                     | -7                                | 5                                                | -1                         | 1                                | -2                            |
| External Public Debt/Exports 1982                    | 0                                    | 89*                                     | -6                                | 2                                                | 2                          | 5                                | -5                            |
| Public Borrowing Commitments/Exports 1982            | 0                                    | 88*                                     | -8                                | 3                                                | 0                          | 4                                | -6                            |
| Resource Balance/GDP 1982                            | 9                                    | 84*                                     | 2                                 | -24                                              | 0                          | 3                                | 12                            |
| Growth in Public Consumption 1970-80                 | 3                                    | 82*                                     | -4                                | 0                                                | -2                         | 31                               | -8                            |
| Private Sector Consumption as % of GDP<br>1960       | 17                                   | -54*                                    | -34                               | -9                                               | 0                          | 9                                | -34                           |
| Private Sector Consumption as % of GDP<br>1982       | -10                                  | -65*                                    | -16                               | -25                                              | 1                          | -7                               | -23                           |
| Terms of Trade 1982                                  | 12                                   | -73*                                    | 13                                | 11                                               | 9                          | 15                               | 20                            |
| Gross International Reserves 1982                    | -18                                  | -8                                      | 83*                               | -3                                               | 18                         | 11                               | 0                             |
| Gross International Reserves 1970                    | 5                                    | 0                                       | 83*                               | 4                                                | -5                         | -10                              | -11                           |
| Gross Domestic Product 1982                          | 39                                   | -5                                      | 51*                               | -10                                              | 1                          | 4                                | -16                           |
| Average Maturity of External Debt 1982               | -12                                  | 9                                       | -43*                              | 3                                                | 27                         | 0                                | -22                           |
| Current Account Balance 1982                         | -16                                  | 5                                       | -53*                              | 1                                                | 16                         | -15                              | 21                            |
| Export Growth 1960-70                                | 12                                   | 5                                       | -1                                | 76*                                              | -7                         | 4                                | -39                           |
| Exports as % of GDP 1982                             | 0                                    | -8                                      | 12                                | 65*                                              | -16                        | -3                               | 13                            |
| External Public Debt as % of GDP 1982                | 6                                    | -5                                      | -21                               | 65*                                              | -4                         | -23                              | 20                            |
| Public Consumption as % of GDP 1992                  | -2                                   | 41                                      | 3                                 | 64*                                              | 8                          | -15                              | 3                             |
| Public Consumption as % of GDP 1960                  | -12                                  | 1                                       | -8                                | 64*                                              | 23                         | 13                               | -2                            |
| Military Expenditures/GDP 1981                       | 0                                    | -11                                     | 6                                 | 50*                                              | 35                         | 5                                | -15                           |
| Net Inflow Public External Loans 1970                | 36                                   | 3                                       | 7                                 | 4                                                | 65*                        | 7                                | 4                             |
| External Public Debt 1970                            | 43                                   | -6                                      | -37                               | -3                                               | 56*                        | -13                              | -6                            |
| External Public Debt as % of GDP 1970                | -4                                   | -6                                      | 10                                | 12                                               | 48*                        | 7                                | 24                            |
| Growth in Imports 1970-82                            | 15                                   | 11                                      | 10                                | -5                                               | -2                         | 72*                              | -18                           |
| Growth in Private Sector Consumption<br>1970-82      | -2                                   | 47                                      | -2                                | -3                                               | 9                          | 61*                              | 9                             |
| Debt Service as % of Exports 1982                    | 25                                   | -7                                      | 21                                | -3                                               | 6                          | -11                              | 60*                           |



Frederiksen and Looney state the crucial determinant of the impact of defense expenditures on economic growth is the country's financial resource constraints. According to them a country that is severely resource constrained will probably cut higher growth development programs from their budget in order to maintain defense programs. They also contend the opposite is likely for countries with a relative abundance of financial resources. These countries can easily afford the high growth development programs while maintaining or even increasing defense programs.

#### B. DISCRIMINANT ANALYSIS

Based on the above and the lack of determinacy in the country factor scores, it makes sense to split the sample of developing countries into groups based on some measure of resource constraint. Measures of debt and capital flow from Table 1 were used to perform a discriminant analysis. Variables with the highest loading in each of the individual factors were used.

The results of the discriminant analysis on Table 11 show a high degree of probability of correct placement in each group. The discriminant analysis was able to split the country sample into two distinct groups based largely on the external debt facing each country. Venezuela is in group II along with several other major oil exporters. Group I

Table 11

**Discriminant Analysis Total Sample Countries  
Based On Economic Factor Analysis High Loadings**

| Group I                |                                        | Group II         |                                        |
|------------------------|----------------------------------------|------------------|----------------------------------------|
| Country                | Probability<br>of Correct<br>Placement | Country          | Probability<br>of Correct<br>Placement |
| 1. Israel              | 69.44                                  | 1. Greece        | 57.78                                  |
| 2. Honduras            | 83.48                                  | 2. India         | 84.91                                  |
| 3. Cameroon            | 60.73                                  | 3. Nigeria       | 89.07                                  |
| 4. Sudan               | 66.47                                  | 4. Indonesia     | 90.67                                  |
| 5. Costa Rica          | 92.64                                  | 5. Egypt         | 68.20                                  |
| 6. Bolivia             | 86.27                                  | 6. Korea         | 89.95                                  |
| 7. Somalia             | 86.46                                  | 7. Rwanda        | 69.08                                  |
| 8. Tunisia             | 68.31                                  | 8. Turkey        | 66.95                                  |
| 9. Morocco             | 73.06                                  | 9. Spain         | 51.89                                  |
| 10. Guatemala          | 54.91                                  | 10. Venezuela    | 80.26                                  |
| 11. Malawi             | 91.40                                  | 11. Mexico       | 99.69                                  |
| 12. El Salvador        | 65.90                                  | 12. Brazil       | 99.02                                  |
| 13. Mali               | 97.12                                  | 13. Algeria      | 76.44                                  |
| 14. Pakistan           | 86.98                                  | 14. Philippines  | 55.78                                  |
| 15. Paraguay           | 60.02                                  | 15. Libya        | 75.69                                  |
| 16. Ecuador            | 56.61                                  | 16. Colombia     | 54.63                                  |
| 17. Dominican Republic | 74.12                                  | 17. Thailand     | 60.95                                  |
| 18. Liberia            | 91.77                                  | 18. Malaysia     | 65.16                                  |
| 19. Ivory Coast        | 84.42                                  | 19. Argentina    | 66.09                                  |
| 20. Mauritania         | 96.04                                  | 20. Saudi Arabia | 44.65                                  |
| 21. Sierra Leone       | 86.05                                  | 21. Kuwait       | 81.31                                  |
| 22. Panama             | 94.37                                  | 22. Syria        | 61.95                                  |
| 23. Chile              | 70.09                                  | 23. Jordan       | 50.81                                  |
| 24. Chad               | 87.18                                  |                  |                                        |
| 25. Uruguay            | 67.87                                  |                  |                                        |
| 26. Tanzania           | 79.87                                  |                  |                                        |
| 27. Uganda             | 88.76                                  |                  |                                        |
| 28. Ethiopia           | 70.24                                  |                  |                                        |
| 29. Cent. African Rep. | 76.89                                  |                  |                                        |
| 30. Ghana              | 78.72                                  |                  |                                        |
| 31. Burma              | 62.91                                  |                  |                                        |
| 32. Sri Lanka          | 75.39                                  |                  |                                        |
| 33. Jamaica            | 90.66                                  |                  |                                        |
| 34. Trinidad           | 77.62                                  |                  |                                        |
| 35. Zambia             | 95.88                                  |                  |                                        |
| 36. Peru               | 71.67                                  |                  |                                        |
| 37. Zimbabwe           | 85.68                                  |                  |                                        |
| 38. Kenya              | 86.61                                  |                  |                                        |

countries seem to be the poorer, less economically dynamic nations.

Further insight in the profile of the two groups can be gained by examining Table 12, the means of variables used in the discriminant analysis. Group II countries spend 1.5 times as much per gross domestic product on military expenditures as do group I countries. Military expenditures per person in group II countries are 4 times that of group I and total military expenditures for group II are 7.5 times as large as those for group I.

Group II countries are considerably larger, more affluent, and less reliant on external debt, as a percentage of GNP, than are group I countries.

#### C. REGRESSION ANALYSIS

Based on the profiles of groups I and II, one might predict that the public external debt and external capital flow have played a larger role in facilitating military expenditures in group I. Venezuela and the remainder of the group II countries may have alternative means by which military expenditures can be financed and thus less dependent on external debt and capital flow.

Various measures of military expenditures were used to test this hypothesis. They are: (1) total military expenditures; (2) military expenditures as a proportion of gross national product; (3) military expenditures per capita;

Table 12  
Means Of Discriminant Analysis Variables

| Variable                 | Total<br>Sample | Group<br>I | Group<br>II |
|--------------------------|-----------------|------------|-------------|
| Discriminating Variables |                 |            |             |
| ECIBR                    | 0.70            | 0.94       | 0.26        |
| PDB                      | 5932.00         | 2629.30    | 11796.90    |
| GIRB                     | 2597.20         | 593.20     | 6138.90     |
| PDPB                     | 35.30           | 44.30      | 19.20       |
| ZB                       | 4.10            | 1.09       | 9.50        |
| DSEB                     | 14.10           | 15.00      | 12.50       |
| PDPA                     | 17.30           | 21.20      | 10.40       |
| Other Variables          |                 |            |             |
| MEY                      | 4.20            | 3.60       | 5.10        |
| GNPPER                   | 1793.20         | 1066.70    | 3048.20     |
| MEP                      | 117.90          | 57.70      | 223.30      |
| GEDB                     | 14.10           | 13.40      | 15.30       |
| ME                       | 1319.10         | 399.10     | 2943.90     |

ECIBR = Gross Inflow of Public Loans 1982 Divided by Exports 1982  
 PDB = External Public Debt 1982  
 GIRB = Gross International Reserves 1982  
 PDPB = External Public Debt as a Percentage of Gross Domestic Product 1982  
 ZB = Average Annual Growth in Imports 1970-82  
 DSEB = Debt Service as a Percentage of Exports 1982  
 PDPA = External Public Debt as a Percentage of Gross Domestic Product 1970  
  
 MEY = Military Expenditure as a Percentage of Gross National Product 1981  
 GNPPER = Per Capita Gross National Product 1982  
 MEP = Military Expenditure Per Capita 1981  
 GEDB = Defense Expenditures as a Percentage of Total Government Expenditure  
 ME = Total Military Expenditure 1981

and (4) military expenditures as a percentage of the government budget. These were first analyzed by factor analysis and then by regression analysis.

The factor analysis served to show how group I and group II countries differed from each other and how they differ from the total sample of countries in terms of the loading of the various measures of military expenditures on the economic factors. The regression analysis was performed to obtain a more accurate depiction and quantification of the economic variables most responsible for the observed difference in military expenditures between countries.

Gross domestic product, gross national product per capita and a measure of military expenditures were added to the variables from Table 1 for the factor analysis. The first measure of military expenditure examined was total military expenditures. The results showed that the separate groups of countries point to different variables being associated with total military expenditures than does the total country sample.

The total country sample in Table 13 loads highest on factor 3. This indicates that gross national product per capita and international reserves play a large role in affecting military expenditures. The group I countries load highest on factor 1. This indicates group I countries have a strong association between military expenditures and public external debt. Group II countries on Table 15 loaded highest

Table 13

Oblique Rotated Factor Pattern: Economic Variables,  
Total Military Expenditures, Total Country Sample

| Variables                                               | Factors                                    |                                                        |                                                          |                          |                             |                         |                                    |
|---------------------------------------------------------|--------------------------------------------|--------------------------------------------------------|----------------------------------------------------------|--------------------------|-----------------------------|-------------------------|------------------------------------|
|                                                         | 1                                          | 2                                                      | 3                                                        | 4                        | 5                           | 6                       | 7                                  |
|                                                         | Factors<br>Affecting<br>Total<br>Debt 1982 | Factors<br>Affecting<br>Public<br>Share<br>Consumption | Factors<br>Affecting<br>Total<br>Military<br>Expenditure | External<br>Debt<br>1982 | Growth<br>in<br>Consumption | Debt<br>Service<br>1982 | Public<br>External<br>Debt<br>1982 |
| Repayment of Principal on Public<br>External Loans 1970 | 100*                                       | -4                                                     | -4                                                       | 0                        | -27                         | 8                       | 0                                  |
| Payment of Interest on External<br>Public Debt 1970     | 97*                                        | -9                                                     | -1                                                       | 6                        | -24                         | 3                       | 9                                  |
| Total Public External Debt 1982                         | 95*                                        | 1                                                      | -2                                                       | 4                        | 11                          | 14                      | 6                                  |
| Gross Inflow Public Loans 1982                          | 94*                                        | 2                                                      | -4                                                       | 2                        | 15                          | 11                      | -13                                |
| Payment of Interest on External<br>Public Debt 1982     | 89*                                        | 0                                                      | -2                                                       | 0                        | 12                          | 23                      | -15                                |
| Public External Borrowing Commitments<br>1982           | 88*                                        | -4                                                     | -4                                                       | 7                        | 27                          | 3                       | -5                                 |
| Gross Inflow Public Loans 1970                          | 86*                                        | -2                                                     | 3                                                        | 3                        | -8                          | 7                       | 41                                 |
| Total Public External Debt 1970                         | 70*                                        | -7                                                     | 0                                                        | 6                        | -10                         | -8                      | 53                                 |
| Repayment of Principal on Public<br>External Debt 1982  | 61*                                        | 2                                                      | 14                                                       | -4                       | 26                          | 37                      | 12                                 |
| Gross Domestic Product 1982                             | 52*                                        | -15                                                    | 44                                                       | 0                        | 7                           | -24                     | -7                                 |
| Growth in Exports 1970-82                               | 46*                                        | 23                                                     | 4                                                        | -37                      | -18                         | -22                     | -12                                |
| Current Account Balance 1970                            | -87*                                       | -11                                                    | 17                                                       | 5                        | -10                         | 6                       | -5                                 |
| Growth in Exports 1960-70                               | 14                                         | 85*                                                    | -13                                                      | -7                       | 5                           | -45                     | -8                                 |
| Gross Inflow Public Loans 1982/<br>GDP 1982             | 9                                          | 87*                                                    | 1                                                        | 26                       | -4                          | 0                       | -10                                |
| Public Consumption as % GDP 1982                        | -2                                         | 82*                                                    | 18                                                       | 1                        | -14                         | 7                       | 12                                 |
| Public External Debt % GDP 1982                         | 4                                          | 78*                                                    | -13                                                      | 14                       | -11                         | 16                      | 8                                  |
| Exports as % GDP 1982                                   | -7                                         | 75*                                                    | 21                                                       | -10                      | 6                           | 21                      | -6                                 |
| Public Consumption % GDP 1960                           | -15                                        | 71*                                                    | -7                                                       | -11                      | 14                          | -3                      | 31                                 |
| Resource Balance % GDP 1982                             | 24                                         | -53*                                                   | 13                                                       | -26                      | -10                         | 55                      | 0                                  |
| Gross International Reserves 1982                       | -13                                        | -12                                                    | 89*                                                      | 0                        | 13                          | -11                     | 11                                 |
| Gross National Product per Capita<br>1982               | -7                                         | 10                                                     | 86*                                                      | 0                        | -13                         | 15                      | 19                                 |
| Gross International Reserves 1970                       | 12                                         | -2                                                     | 83*                                                      | -9                       | -12                         | -15                     | -14                                |
| Total Military Expenditures 1981                        | 37                                         | 16                                                     | 41*                                                      | -14                      | -1                          | -26                     | 26                                 |
| Current Account Balance 1982                            | -19                                        | 4                                                      | -50*                                                     | 5                        | -14                         | 30                      | 28                                 |
| Private Consumption % GDP 1960                          | 23                                         | -12                                                    | -63*                                                     | -3                       | 9                           | -37                     | 0                                  |
| Average Maturity of External Public<br>Debt 1982        | -8                                         | 4                                                      | -69*                                                     | -9                       | 0                           | -21                     | 35                                 |
| Public External Loan Commitments/<br>Exports 1982       | 3                                          | 0                                                      | -3                                                       | 95*                      | 4                           | -20                     | -8                                 |
| Gross Inflow Public Loans/Exports<br>1982               | 8                                          | 13                                                     | 11                                                       | 88*                      | -7                          | 0                       | -12                                |
| Public External Debt/Exports 1982                       | 4                                          | 2                                                      | -8                                                       | 88*                      | -2                          | -4                      | 11                                 |
| Growth in Private Consumption 1970-82                   | -11                                        | -10                                                    | 6                                                        | 20                       | 86*                         | 8                       | 14                                 |
| Growth in Imports 1970-82                               | 11                                         | -7                                                     | -2                                                       | -8                       | -24                         | -24                     | -6                                 |
| Growth in Public Consumption 1970-82                    | 2                                          | 4                                                      | -23                                                      | -19                      | 68*                         | -1                      | -5                                 |
| Terms of Trade 1982                                     | 20                                         | 21                                                     | 26                                                       | 5                        | 46*                         | 13                      | 22                                 |
| Debt Service External Public Debt<br>% Exports 1982     | 24                                         | 3                                                      | -7                                                       | -6                       | -4                          | 74*                     | 18                                 |
| Private Consumption % GDP 1982                          | -12                                        | -38                                                    | -37                                                      | 6                        | -21                         | -41*                    | -5                                 |
| Net Inflow Public External Loans 1970                   | 60                                         | 0                                                      | 8                                                        | 4                        | 7                           | 5                       | 65*                                |
| Public External Debt % GDP 1970                         | 0                                          | 12                                                     | -31                                                      | -6                       | 5                           | 36                      | 59*                                |

Table 14

Oblique Rotated Factor Patterns: Economic Variables,  
Total Military Expenditures, 1981, Group I Countries

| Variables                                               | Determinants<br>Military<br>Expenditures | Factors                         |                   |                             |                                 |                                  |                                        |
|---------------------------------------------------------|------------------------------------------|---------------------------------|-------------------|-----------------------------|---------------------------------|----------------------------------|----------------------------------------|
|                                                         |                                          | Factor<br>Public<br>Consumption | Debt<br>Servicing | External<br>Exports<br>1982 | Growth<br>Public<br>Consumption | Growth<br>Private<br>Consumption | Public<br>Expenditure<br>% of GDP 1970 |
| Total Military Expenditures 1981                        | 100*                                     | 4                               | -20               | -2                          | -13                             | 0                                | 1                                      |
| Net Inflow Public External Loans<br>1970                | 97*                                      | 8                               | 6                 | 2                           | -9                              | -1                               | 27                                     |
| Total Public Debt 1982                                  | 95*                                      | -3                              | -9                | 14                          | 10                              | 11                               | 2                                      |
| Gross International Reserves 1982                       | 92*                                      | -4                              | 3                 | -11                         | -13                             | 6                                | 9                                      |
| GNP Per Capita 1982                                     | 88*                                      | -11                             | -11               | 14                          | 6                               | -4                               | 1                                      |
| Total Public Debt 1970                                  | 87*                                      | 4                               | 31                | -3                          | -10                             | -5                               | 25                                     |
| Gross Inflow Public Loans 1970                          | 85*                                      | 8                               | 37                | 2                           | -7                              | -1                               | 27                                     |
| Interest Payments External Debt<br>1982                 | 82*                                      | -3                              | 4                 | 1                           | 34                              | 6                                | -2                                     |
| Repayment of Principal on Public<br>External Loans 1982 | 79*                                      | -4                              | 1                 | 0                           | 28                              | 12                               | -22                                    |
| Gross International Reserves 1970                       | 77*                                      | -9                              | 10                | -18                         | 0                               | -12                              | -29                                    |
| Gross Inflow Public Loans 1982                          | 73*                                      | 2                               | 23                | 12                          | 15                              | 5                                | -24                                    |
| Public External Borrowing Commit-<br>ments 1982         | 71*                                      | 0                               | 21                | 10                          | 9                               | 9                                | -32                                    |
| GNP 1982                                                | 55*                                      | -33                             | 24                | -6                          | -7                              | -14                              | -2                                     |
| Current Account, Balance of Payments<br>1982            | -72*                                     | 0                               | -25               | 5                           | 7                               | -8                               | 14                                     |
| Current Account, Balance of Payments<br>1970            | -84*                                     | -6                              | 51                | 3                           | 2                               | 14                               | -18                                    |
| Growth of Exports 1960-70                               | -22                                      | 95*                             | 8                 | -4                          | -6                              | 1                                | 3                                      |
| Gross Inflow Public Loans/GDP 1982                      | -14                                      | 85*                             | 20                | 19                          | 16                              | -5                               | -16                                    |
| Public External Debt % of GDP 1982                      | -13                                      | 83*                             | 7                 | 10                          | 26                              | -5                               | 7                                      |
| Public Consumption % of GDP 1960                        | 11                                       | 81*                             | -14               | -19                         | -23                             | 20                               | -2                                     |
| Public Consumption % of GDP 1982                        | 42                                       | 68*                             | -13               | 4                           | 15                              | -21                              | -2                                     |
| Exports % of GDP 1982                                   | 5                                        | 65*                             | 3                 | 0                           | 49                              | -20                              | 1                                      |
| Resource Balance % of GDP                               | -1                                       | -70*                            | 13                | -15                         | 53                              | -12                              | 16                                     |
| Repayments of Principal on Public<br>Loans 1970         | 20                                       | 5                               | 97*               | 1                           | 1                               | 0                                | 15                                     |
| Interest Payments on External Debt<br>1982              | 24                                       | 2                               | 92*               | -1                          | -3                              | -6                               | 14                                     |
| Average Maturity of External Debt<br>1982               | -9                                       | 10                              | -49*              | -26                         | -24                             | 0                                | 11                                     |
| Public External Debt/Exports 1982                       | 4                                        | 1                               | 0                 | 94*                         | -16                             | 9                                | 22                                     |
| Public External Borrowing Commit-<br>ments/Exports 1982 | 2                                        | 6                               | 5                 | 93*                         | -26                             | 11                               | -19                                    |
| Gross Inflow Public External Loans/<br>Exports 1982     | -1                                       | 9                               | 13                | 89*                         | 1                               | -4                               | -3                                     |
| Growth in Exports 1970-82                               | 36                                       | 16                              | 24                | -41*                        | -15                             | 19                               | -7                                     |
| Growth in Public Consumption 1970-82                    | -33                                      | 2                               | -0                | -21                         | 69*                             | 24                               | 8                                      |
| External Debt Service % of Exports<br>1982              | 18                                       | -4                              | 14                | -16                         | 69*                             | 21                               | -5                                     |
| Private Consumption % of GDP 1982                       | -12                                      | -30                             | 1                 | -2                          | -79*                            | -3                               | -9                                     |
| Growth in Imports 1970-82                               | -1                                       | 5                               | 16                | -9                          | 86*                             | 14                               | 24                                     |
| Growth in Private Consumption 1970-82                   | 12                                       | -14                             | -20               | 30                          | 15                              | 81*                              | 22                                     |
| Terms of Trade 1982                                     | 7                                        | 48                              | -14               | -4                          | 27                              | 47*                              | 3                                      |
| Private Consumption % of GDP 1960                       | -34                                      | -18                             | 22                | 9                           | 3                               | 24                               | 72*                                    |
| Public External Debt % of GDP 1970                      | 39                                       | 7                               | 0                 | -5                          | 15                              | 24                               | 58*                                    |



Table 15

Oblique Rotated Factor Pattern: Economic Variables,  
Total Military Expenditures, 1981, Group II Countries

| Variables                                             | Factors                            |                                               |                                    |                                    |                                      |                                        |
|-------------------------------------------------------|------------------------------------|-----------------------------------------------|------------------------------------|------------------------------------|--------------------------------------|----------------------------------------|
|                                                       | 1<br>Factor<br>Public<br>Debt 1982 | 2<br>Factor<br>Public<br>Debt/Exports<br>1982 | 3<br>Factor<br>Public<br>Debt 1982 | 4<br>Factor<br>Public<br>Debt 1982 | 5<br>Factor<br>Public<br>Consumption | 6<br>Factor<br>Growth<br>in<br>Exports |
| Interest Payments on External Debt 1982               | 100*                               | -8                                            | 1                                  | -14                                | 8                                    | -3                                     |
| Gross Inflow Public External Loans 1982               | 100*                               | -1                                            | 3                                  | -3                                 | 15                                   | 0                                      |
| Public External Borrowing Commitments                 | 93*                                | 3                                             | -12                                | 9                                  | 34                                   | 0                                      |
| Total Public External Debt 1982                       | 93*                                | -1                                            | 4                                  | 16                                 | 4                                    | 4                                      |
| Repayments of Principal on Public External Loans 1970 | 74*                                | 2                                             | -2                                 | 18                                 | -39                                  | 17                                     |
| Repayments of Principal on Public External Loans 1982 | 68*                                | -13                                           | 35                                 | 19                                 | 19                                   | -12                                    |
| Debt Service on External Debt as % of Exports 1982    | 68*                                | 6                                             | 28                                 | -4                                 | -14                                  | -31                                    |
| Interest Payments on External Public Debt 1970        | 67*                                | 4                                             | -12                                | 30                                 | -35                                  | 8                                      |
| Resource Balance as % GDP 1982                        | 57*                                | -40                                           | 13                                 | 15                                 | -22                                  | -12                                    |
| Current Account Balance of Payments 1970              | -89*                               | -6                                            | 14                                 | -7                                 | -15                                  | -24                                    |
| Public External Borrowing Commitments/Exports 1982    | 1                                  | 84*                                           | -22                                | 0                                  | 0                                    | -18                                    |
| Average Maturity Public External Debt 1982            | -42                                | 80*                                           | -5                                 | 27                                 | 0                                    | 9                                      |
| Public External Debt/Exports 1982                     | 26                                 | 69*                                           | -1                                 | 20                                 | -44                                  | -13                                    |
| Gross Inflow Public Loans/Exports 1982                | 51                                 | 65*                                           | 4                                  | -12                                | -32                                  | -8                                     |
| Current Account Balance of Payments 1982              | -22                                | 47*                                           | 49                                 | 37                                 | -9                                   | -6                                     |
| Terms of Trade 1982                                   | 43                                 | -48*                                          | -1                                 | 28                                 | 33                                   | -25                                    |
| Gross Domestic Product 1982                           | 44                                 | -57*                                          | -46                                | 22                                 | -8                                   | 7                                      |
| Gross International Reserves 1982                     | -32                                | -71*                                          | -10                                | 29                                 | -13                                  | -28                                    |
| GNP Per Capita 1982                                   | 4                                  | -72*                                          | 12                                 | -30                                | -34                                  | -5                                     |
| Gross International Reserves 1970                     | 0                                  | -78*                                          | -13                                | 0                                  | -42                                  | 10                                     |
| Public Consumption % GDP 1970                         | -26                                | -6                                            | 79*                                | 27                                 | 17                                   | 14                                     |
| Public External Debt % GDP 1982                       | 45                                 | 23                                            | 79*                                | 2                                  | -6                                   | 7                                      |
| Exports % GDP 1982                                    | 2                                  | -25                                           | 71*                                | -16                                | 25                                   | 34                                     |
| Gross Inflow Public Loans/GDP 1982                    | 37                                 | 17                                            | 67*                                | -21                                | 9                                    | 21                                     |
| Public Consumption % GDP 1982                         | -21                                | 2                                             | 55*                                | -26                                | -24                                  | 17                                     |
| Resource Balance % GDP 1982                           | -18                                | 23                                            | -75*                               | -7                                 | 10                                   | 15                                     |
| Net Inflow Public External Loans 1970                 | 18                                 | 8                                             | 3                                  | 93*                                | 9                                    | -6                                     |
| Total Public External Debt 1970                       | 16                                 | 12                                            | -14                                | 80*                                | -13                                  | 7                                      |
| Public External Debt % GDP 1970                       | 7                                  | 17                                            | 38                                 | 69*                                | 36                                   | 7                                      |
| Gross Inflow Public Loans 1970                        | 49                                 | 6                                             | 0                                  | 66*                                | -14                                  | 5                                      |
| Total Military Expenditures 1981                      | -8                                 | -44                                           | 1                                  | 59*                                | -18                                  | 51                                     |
| Growth in Imports 1970-80                             | 19                                 | 7                                             | -14                                | -5                                 | 90*                                  | -7                                     |
| Growth in Public Sector Consumption 1970-82           | -1                                 | 36                                            | 3                                  | 8                                  | 80*                                  | 2                                      |
| Growth in Private Consumption 1970-82                 | 15                                 | -11                                           | 39                                 | 8                                  | 69*                                  | -21                                    |
| Growth in Exports 1970-82                             | 20                                 | -6                                            | 20                                 | 1                                  | -35                                  | 82                                     |
| Growth in Exports 1960-82                             | -7                                 | -4                                            | 23                                 | 5                                  | 2                                    | 81*                                    |
| Private Consumption % GDP 1960                        | 14                                 | 32                                            | -49                                | 6                                  | 22                                   | 56*                                    |

on factors 4 and 6. This indicates that the group II countries have a more diverse pattern of economic variables that affect military expenditures.

The number of variables for regression analysis was expanded to include the results of the factor analysis. Variables that reflected the main factors upon which military expenditures loaded heavily on were added to the data set.

A step wise regression for the total country sample, Table 16, indicated that the order of importance of variables affecting total military expenditures was: (1) the share of military expenditure for 1981 in the total government budget (GEBD); (2) the gross domestic product (GDPB; (3) the public external debt in 1970 (PDA); (4) the gross domestic product per capita (GNPPER). The debt service as a percentage of exports in 1982 (DSEB) was also significant but had a negative sign.

The best equation on Table 16 for estimating military expenditures was number 9. This equation was expected to explain 79 percent of the fluctuations in military expenditures. A comparison of actual values versus predicted values, using equation number 9 from Table 16, is shown in Table 17. Only one country, the Philippines, had a predicted value within 5 percent of the actual level of its military expenditure. Venezuela's predicted value was 25 percent below its actual level.

Table 16

Determinants Of Military Expenditures,  
Total Country Sample, Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |                |                |                |                  |                |                  |                |                  | Statistics     |       |    |
|----------|-----------------------|----------------|----------------|----------------|------------------|----------------|------------------|----------------|------------------|----------------|-------|----|
|          | GEDB                  | GDPB           | PDA            | POP            | PBCB             | GNPPER         | ECNIA            | PDB            | DSEB             | r <sup>2</sup> | F     | DF |
| 1        | ME81=0.46<br>(4.88)   | 0.47<br>(3.97) | 0.33<br>(2.84) |                |                  |                |                  |                |                  | .704           | 30.91 | 42 |
| 2        | 0.47<br>(4.87)        | 0.46<br>(3.79) | 0.31<br>(2.54) | 0.06<br>(0.55) |                  |                |                  |                |                  | .706           | 22.85 | 42 |
| 3        | 0.46<br>(5.28)        | 0.72<br>(5.09) | 0.40<br>(3.63) |                | -0.37<br>(-2.78) |                |                  |                |                  | .754           | 29.13 | 42 |
| 4        | 0.46<br>(5.70)        | 0.62<br>(4.44) | 0.46<br>(4.17) |                | -0.33<br>(-2.57) | 0.18<br>(2.35) |                  |                |                  | .789           | 27.00 | 41 |
| 5        | 0.47<br>(5.13)        | 0.40<br>(3.83) | 0.40<br>(3.46) |                |                  | 0.21<br>(2.58) |                  |                |                  | .750           | 27.84 | 41 |
| 6        | 0.47<br>(4.86)        | 0.50<br>(3.81) | 0.43<br>(2.19) |                |                  |                | -0.13<br>(-0.61) |                |                  | .706           | 22.90 | 42 |
| 7        | 0.45<br>(5.14)        | 0.71<br>(4.91) | 0.39<br>(3.27) |                | -0.50<br>(-1.52) |                |                  | 0.67<br>(0.41) |                  | .755           | 22.83 | 42 |
| 8        | 0.47<br>(5.09)        | 0.50<br>(4.31) | 0.33<br>(2.94) |                |                  |                |                  |                | -0.17<br>(-2.0)  | .732           | 25.29 | 41 |
| 9        | 0.46<br>(5.56)        | 0.61<br>(4.27) | 0.44<br>(3.86) |                | -0.45<br>(-1.42) |                |                  | 0.13<br>(0.42) | -0.18<br>(-2.29) | .790           | 22.01 | 41 |

Notes: See text for definition of variables  
 ( ) = t statistic  
 r<sup>2</sup> = correlation coefficient  
 F = F statistic  
 DF = degrees of freedom

Table 17

## Total Military Expenditures , Total Country Sample

| Country            | Actual | Predicted | Actual/<br>Predicted | Placement |
|--------------------|--------|-----------|----------------------|-----------|
| 1. Uganda          | 97     | 1739      | .0558                | Below     |
| 2. Rwanda          | 21     | 251.524   | .0835                | Below     |
| 3. Senegal         | 55     | 426.875   | .1288                | Below     |
| 4. Bolivia         | 196    | 1187      | .1651                | Below     |
| 5. Liberia         | 36     | 207.245   | .1737                | Below     |
| 6. Paraguay        | 78     | 425.798   | .1832                | Below     |
| 7. El Salvador     | 116    | 556.246   | .2085                | Below     |
| 8. Burma           | 204    | 812.653   | .2510                | Below     |
| 9. Trinidad        | 42     | 162.577   | .2583                | Below     |
| 10. Ghana          | 141    | 317.939   | .4435                | Below     |
| 11. Zimbab         | 419    | 795.108   | .5270                | Below     |
| 12. Dominican Rep. | 104    | 183.831   | .5657                | Below     |
| 13. Uruguay        | 363    | 603.748   | .6012                | Below     |
| 14. Brazil         | 1837   | 2965      | .6196                | Below     |
| 15. Ecuador        | 296    | 453.439   | .6528                | Below     |
| 16. Kuwait         | 1254   | 1876      | .6684                | Below     |
| 17. Sudan          | 289    | 417.592   | .6921                | Below     |
| 18. Mexico         | 1196   | 1713      | .6982                | Below     |
| 19. Jordan         | 874    | 1213      | .7205                | Below     |
| 20. Tunisia        | 228    | 261.472   | .8720                | Below     |
| 21. Chile          | 1175   | 1331      | .8828                | Below     |
| 22. India          | 5151   | 5787      | .8901                | Below     |
| 23. Kenya          | 198    | 222.328   | .8906                | Below     |
| 24. Philippines    | 848    | 824.042   | 1.0291               |           |
| 25. Tanzania       | 277    | 257.711   | 1.0748               | Above     |
| 26. Syria          | 2437   | 2252      | 1.0821               | Above     |
| 27. Thailand       | 1335   | 1089      | 1.2259               | Above     |
| 28. Venezuela      | 1059   | 842.796   | 1.2565               | Above     |
| 29. Spain          | 3655   | 2817      | 1.2975               | Above     |
| 30. Israel         | 4374   | 3242      | 1.3492               | Above     |
| 31. Korea          | 4157   | 2943      | 1.4125               | Above     |
| 32. Car            | 14     | 9.285     | 1.5078               | Above     |
| 33. Morocco        | 1080   | 698.584   | 1.5460               | Above     |
| 34. Argentina      | 3186   | 1921      | 1.6585               | Above     |
| 35. Indonesia      | 2867   | 1611      | 1.7796               | Above     |
| 36. Peru           | 1026   | 569.440   | 1.8018               | Above     |
| 37. Malaysia       | 1446   | 536.720   | 2.6941               | Above     |

## Notes:

Based on regression equation:

$$MEB1 = 0.46GED8 + 0.62GDP + 0.45PDA - 0.33P8C8 + 0.19GNPPER$$

(5.70)      (4.44)      (4.17)      (-2.57)      (2.35)

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

A step wise regression for the group I countries, Table 18, indicated that the order of importance of variables affecting total military expenditures was: (1) the public debt in 1982 (PDB); (2) the population for 1982 (POP); (3) the share of military expenditure for 1981 in the total government budget (GEDB); and (4) the net flow of external loans in 1970 (ECNIA). As with the total country sample, the debt service as a percentage of exports in 1982 (DSEB) was statistically significant and negative. The best equation on Table 18 for estimating military expenditures was number 7. This equation was expected to explain 94.5 percent of the fluctuations in military expenditures. As might be expected, the public debt in 1982 (PDB) had the highest correlation with total military expenditures. PDB was not statistically significant in the total country sample. Interestingly the public debt in 1970 (PDA), which was important in explaining the pattern of military expenditures for the total country sample, is not statistically significant for group I countries when the regression equation includes population (POP) and net external capital inflows for 1970 (ECNIA).

Regression equations for group II countries, Table 19, as with the two previous groups produced a positive and statistically significant relationship with the share of military expenditures for 1981 in the total government budget. The order of importance of variables affecting total military expenditures was: (1) the gross domestic product

Table 18

Determinants Of Military Expenditures,  
Group I Countries' Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |                |                  |                |                |                |                  |                | Statistics     |       |    |
|----------|-----------------------|----------------|------------------|----------------|----------------|----------------|------------------|----------------|----------------|-------|----|
|          | GEDB                  | PDB            | GDPB             | PDA            | POP            | ECNIA          | DSEB             | GIRBY          | r <sup>2</sup> | F     | DF |
| 1 ME=81  | 0.25<br>(2.99)        | 0.77<br>(8.29) |                  |                |                |                |                  |                | .862           | 77.78 | 27 |
| 2        | 0.27<br>(3.16)        | 0.72<br>(7.58) | 0.09<br>(1.14)   |                |                |                |                  |                | .868           | 52.92 | 27 |
| 3        | 0.24<br>(3.13)        | 0.49<br>(4.19) | -0.07<br>(-0.77) | 0.54<br>(3.14) |                |                |                  |                | .909           | 44.36 | 27 |
| 4        | 0.25<br>(3.34)        | 0.49<br>(4.22) |                  | 0.47<br>(3.25) | 0.28<br>(2.90) |                |                  |                | .907           | 56.92 | 27 |
| 5        | 0.20<br>(2.96)        | 0.36<br>(3.01) |                  |                | 0.26<br>(3.29) | 0.60<br>(4.14) |                  |                | .922           | 68.44 | 27 |
| 6        | 0.20<br>(2.88)        | 0.36<br>(2.96) |                  | 0.05<br>(0.22) | 0.27<br>(3.00) | 0.55<br>(2.09) |                  |                | .923           | 52.15 | 27 |
| 7        | 0.22<br>(3.69)        | 0.56<br>(4.50) |                  |                | 0.27<br>(4.00) | 0.45<br>(3.36) | -0.19<br>(-3.01) |                | .945           | 72.91 | 26 |
| 8        | 0.22<br>(3.43)        | 0.38<br>(3.36) |                  |                | 0.36<br>(4.15) | 0.53<br>(3.83) |                  | 0.17<br>(2.17) | .936           | 64.55 | 27 |

Notes: See text for definition of variables  
 ( ) = t statistic  
 r<sup>2</sup> = correlation coefficient  
 F = F statistic  
 DF = degrees of freedom

Table 19

Determinants Of Military Expenditures,  
Group II Countries' Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |                |                |                  |                  |                  |                  |                | Statistics     |       |    |
|----------|-----------------------|----------------|----------------|------------------|------------------|------------------|------------------|----------------|----------------|-------|----|
|          | GEDB                  | GDPB           | PDA            | PDB              | POP              | PBCB             | ECIBE            | ECIB           | r <sup>2</sup> | F     | DF |
| 1        | MEB1= 0.67<br>(2.85)  | 0.76<br>(3.21) |                |                  |                  |                  |                  |                | .507           | 6.18  | 14 |
| 2        | 0.52<br>(2.57)        | 0.83<br>(2.90) | 0.51<br>(2.38) | -0.61<br>(-2.41) |                  |                  |                  |                | .736           | 6.98  | 14 |
| 3        | 0.48<br>(3.70)        | 1.12<br>(5.61) | 3.39<br>(4.49) | -1.90<br>(-5.13) | -2.48<br>(-3.88) |                  |                  |                | .901           | 16.45 | 14 |
| 4        | 0.43<br>(3.95)        | 0.91<br>(4.93) | 2.73<br>(4.05) | -1.44<br>(-4.04) | -1.86<br>(-3.17) | -0.25<br>(-2.35) |                  |                | .941           | 21.55 | 14 |
| 5        | 0.49<br>(4.71)        | 0.91<br>(5.04) | 3.06<br>(4.96) | -1.46<br>(-4.24) | -2.18<br>(-4.12) |                  | -0.29<br>(-2.44) |                | .944           | 22.32 | 14 |
| 6        | 0.51<br>(6.06)        | 1.05<br>(6.67) | 3.39<br>(6.54) | -2.49<br>(-4.77) | -2.38<br>(-5.49) |                  | -0.26<br>(-2.72) | 0.79<br>(2.31) | .968           | 30.40 | 14 |

Notes: See text for definition of variables

( ) = t statistic

r<sup>2</sup> = correlation coefficient

F = F statistic

DF = degrees of freedom



(GDPB); (2) the public external debt in 1970 (PDA); (3) the share of military expenditures for 1981 in the total government budget. In sharp contrast to group I countries, the public debt in 1982 (PDB) is highly significant but is negative for group II countries as is the population (POP) and public external borrowing commitments in 1982 (PBOCB).

Group II countries present a picture of countries that borrowed heavily in the early 1970s in order to facilitate military expenditures, but for one reason or another ceased this pattern toward the end of the 1970s and early 1980s. Group I countries however appear to have used external capital inflows toward the end of the 1970s and the early 1980s as a means of increasing the amount of funds allocated for military spending.

The best equation on Table 19 for estimating military expenditures was number 6. This equation was expected to explain 96.8 percent of the fluctuations in military expenditures. A comparison of actual values versus predicted values, using equation number 6, is shown in Table 20. Venezuela's predicted value was within one half of one percent of the actual value.

Table 20

Comparison Of Actual Vs. Predicted Values of Total  
Military Expenditures, Group II Countries

| Country         | Actual | Predicted | Actual/<br>Predicted | Placement |
|-----------------|--------|-----------|----------------------|-----------|
| 1. Rwanda       | 21     | 463       | .0453                | Below     |
| 2. Mexico       | 1196   | 1484      | .8059                | Below     |
| 3. Kuwait       | 1254   | 1524      | .8228                | Below     |
| 4. Syria        | 2437   | 2755      | .8845                | Below     |
| 5. Jordan       | 874    | 955       | .9146                | Below     |
| 6. India        | 5151   | 5220      | .9868                |           |
| 7. Spain        | 3655   | 3670      | .9959                |           |
| 8. Brazil       | 1837   | 1844      | .9962                |           |
| 9. Venezuela    | 1059   | 1048      | .9962                |           |
| 10. Korea       | 4157   | 5023      | 1.0333               |           |
| 11. Indonesia   | 2867   | 2706      | 1.0595               | Above     |
| 12. Argentina   | 3186   | 2018      | 1.0918               | Above     |
| 13. Thailand    | 1355   | 1069      | 1.2488               | Above     |
| 14. Philippines | 848    | 351       | 2.4097               | Above     |

## Notes:

Based on regression equation:

$$ME81 = 0.52GED8 + 1.04GDP + 3.3PDA - 1.98PDB - 2.38POP - 0.29ECI8E + 0.38ECNI8$$

(6.13)      (6.68)      (6.49)      (-5.57)      (-5.49)      (-3.04)      (2.23)

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

In summary the basic regression equation for total military expenditures shows the following differences by sample group:

|          | GEDB | PDB | PDA | POP | GDPB | GNPPER |
|----------|------|-----|-----|-----|------|--------|
| Total    | +    | 0   | +   | 0   | +    | +      |
| Group I  | +    | +   | 0   | +   | 0    | 0      |
| Group II | +    | -   | +   | -   | +    | 0      |

Figure 11 - Summary Of Regression Equation For Total Military Spending

Notes : + = Statistically Significant With A Positive Sign At The 95% Level  
 - = Statistically Significant With A Negative Sign At The 95% Level  
 0 = Statistically Insignificant

The results, therefore, lend support to the idea of testing development countries as groups based on a common economic environment rather than as a total sample.

The second measure of military expenditure examined was military expenditure per capita, the results of which confirmed the splitting of the developing countries into two groups based on common economic environment. A factor analysis of the total country sample showed that military expenditures per capita loaded only moderately on one factor on Table 21. This was factor 7, public external debt as a

Table 21

Oblique Factor Pattern: Economic Variables, Military Expenditures Per Capita, Total Country Sample

| Variables                                            | Factors                               |                                   |                           |                   |                             |                                       |                                               |
|------------------------------------------------------|---------------------------------------|-----------------------------------|---------------------------|-------------------|-----------------------------|---------------------------------------|-----------------------------------------------|
|                                                      | Exporting<br>Total<br>Exports<br>1982 | Public<br>Consumption<br>GDP 1982 | International<br>Reserves | Factorial<br>1982 | Growth<br>in<br>Consumption | Deficit<br>Service<br>Exports<br>1982 | Military<br>Expenditure<br>Per Capita<br>1981 |
| Repayment of Principal on Public External Loans 1970 | 100*                                  | -1                                | -5                        | 0                 | -26                         | 9                                     | -10                                           |
| Interest Payments on External Debt 1970              | 100*                                  | -7                                | -3                        | 5                 | -23                         | 1                                     | -4                                            |
| Gross Inflow Public Loans 1970                       | 94*                                   | -4                                | 1                         | 3                 | -6                          | 1                                     | 29                                            |
| Total External Debt 1982                             | 94*                                   | 2                                 | -1                        | 3                 | 11                          | 16                                    | 3                                             |
| Gross Inflow External Loans 1982                     | 89*                                   | 6                                 | -3                        | 1                 | 14                          | 17                                    | -13                                           |
| Public External Borrowing Commitments 1982           | 85*                                   | 0                                 | -4                        | 6                 | 26                          | 7                                     | -8                                            |
| Total Public External Debt 1970                      | 83*                                   | -9                                | -3                        | 6                 | -8                          | -17                                   | 34                                            |
| Interest Payments on External Debt 1982              | 82*                                   | 3                                 | 0                         | 0                 | 11                          | 29                                    | -11                                           |
| Net Inflow Public External Loans 1970                | 73*                                   | -6                                | 7                         | 4                 | 9                           | -4                                    | 54                                            |
| Repayment of Principal on Public External Loans      | 60*                                   | 0                                 | 15                        | -3                | 27                          | 37                                    | 13                                            |
| Gross Domestic Product 1982                          | 56*                                   | -11                               | 39                        | -1                | 8                           | -27                                   | -19                                           |
| Growth of Exports 1970-82                            | 43*                                   | 22                                | 3                         | -38               | -18                         | -14                                   | -4                                            |
| Current Account Balance 1970                         | -86*                                  | -13                               | 14                        | 8                 | -8                          | 0                                     | -10                                           |
| Growth in Exports 1960-70                            | 15                                    | 89*                               | -16                       | -9                | 5                           | -43                                   | -9                                            |
| Gross Inflow Public Loans/ GDP 1982                  | 6                                     | 84*                               | 0                         | 26                | -2                          | 0                                     | -10                                           |
| Public Consumption as % GDP 1982                     | -1                                    | 79*                               | 20                        | 0                 | -19                         | 5                                     | 21                                            |
| External Public Debt % GDP 1982                      | 4                                     | 76*                               | -12                       | 15                | -8                          | 14                                    | 8                                             |
| Exports % GDP 1982                                   | -10                                   | 72*                               | -9                        | -9                | 8                           | 21                                    | 0                                             |
| Public Consumption % GDP 1960                        | -10                                   | 67*                               | -5                        | -11               | 16                          | -10                                   | 36                                            |
| Resource Balance % GDP 1982                          | 21                                    | -55*                              | 12                        | -23               | -9                          | 56                                    | -3                                            |
| Gross National Product per Capita 1982               | -7                                    | 6                                 | 86*                       | 0                 | -13                         | 14                                    | 10                                            |
| Gross International Reserves 1982                    | -4                                    | -14                               | 84*                       | -1                | 16                          | -23                                   | 5                                             |
| Gross International Reserves 1970                    | 17                                    | 0                                 | 77*                       | -10               | -10                         | -21                                   | -17                                           |
| Current Account Balance 1982                         | -19                                   | 0                                 | -46*                      | 8                 | -13                         | 27                                    | 27                                            |
| Private Consumption as % GDP 1960                    | 22                                    | -9                                | -62*                      | -5                | 5                           | -27                                   | -6                                            |
| Average Maturity Public External Debt 1982           | -2                                    | 4                                 | -67*                      | -9                | 0                           | -25                                   | 28                                            |
| Public External Borrowing Commitments/Exports 1982   | 2                                     | 2                                 | -2                        | 95*               | 3                           | -18                                   | -10                                           |
| Gross Inflow Public External Loans/Exports 1982      | 5                                     | 14                                | 11                        | 88*               | -7                          | 3                                     | -13                                           |
| Total Public External Debt/Exports 1982              | 5                                     | 1                                 | -6                        | 88*               | -2                          | -3                                    | 7                                             |
| Growth in Private Consumption 1970-82                | -12                                   | -12                               | 8                         | 21*               | 87*                         | 8                                     | 14                                            |
| Growth in Imports 1970-82                            | 10                                    | -3                                | -2                        | -10               | 80*                         | -20                                   | -9                                            |
| Growth in Public Consumption 1970-82                 | 0                                     | 8                                 | -25                       | -20               | 67*                         | 1                                     | -16                                           |
| Terms of Trade 1982                                  | 23                                    | 18                                | 24                        | 6                 | 49*                         | 7                                     | 18                                            |
| Debt Service % Exports 1982                          | 20                                    | -2                                | -4                        | -3                | -2                          | 73*                                   | 22                                            |
| Private Consumption % GDP 1982                       | -12                                   | -35                               | -35                       | 4                 | -24                         | -38*                                  | -4                                            |
| Public External Debt % GDP 1970                      | -4                                    | 3                                 | -26                       | -3                | 6                           | 31                                    | 63*                                           |
| Military Expenditures per Capita 1981                | 7                                     | 30                                | 35                        | -10               | -17                         | 9                                     | 54*                                           |

percentage of gross domestic product in 1970. In sharp contrast, a factor analysis of group I countries show very high loadings in the factor 1 column for various measures of external debt on Table 22. This result is very similar to the findings for total military expenditures. The factor analysis for group II countries, Table 23, loaded high on a factor representing the balance of payments, exports and public consumption. As in the examination of total military expenditures, group I countries and group II countries load highest on different economic factors with regard to measures of military expenditures per capita.

A step wise regression for the total country sample, Table 24, indicated that three variables, the gross national product per capita (GNPPER), the current account of the balance of payments (CAB) and the share of public consumption in gross domestic product for 1982 (PCB) account for over 83 percent of the fluctuations in military expenditures per capita. While the overall regression results appear to be satisfactory, the best regression equation, number 4 on Table 25, was able to predict only one country's military expenditures per capita within 5 percent of the actual value as shown in Table 26. Venezuela's predicted value was considerably higher than its actual value.

The results for group I countries, Table 25, again show a pattern much different than that obtained from the total sample. In addition to gross national product per capita,

Table 22

Oblique Factor Pattern: Economic Variables, Military  
Expenditures Per Capita, Group I Countries

| Variables                                              | Factors                                                       |                              |                                          |                   |                                 |                                  |                                    |
|--------------------------------------------------------|---------------------------------------------------------------|------------------------------|------------------------------------------|-------------------|---------------------------------|----------------------------------|------------------------------------|
|                                                        | 1                                                             | 2                            | 3                                        | 4                 | 5                               | 6                                | 7                                  |
|                                                        | Participants<br>Military<br>Expenditure<br>1981<br>per Capita | Public<br>Consumption<br>GDP | Payment<br>Public<br>Expenditure<br>1981 | Public<br>Imports | Growth<br>Public<br>Consumption | Growth<br>Private<br>Consumption | Public<br>External<br>Debt<br>1970 |
| Military Expenditures per Capita                       | 100*                                                          | 7                            | -35                                      | -2                | -11                             | 0                                | 2                                  |
| 1981                                                   |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| Net Inflow Public External Loans                       |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| 1970                                                   | 96*                                                           | 8                            | 10                                       | 2                 | -9                              | -1                               | 27                                 |
| Total Public External Debt 1982                        | 94*                                                           | -2                           | -6                                       | 14                | 10                              | 12                               | 2                                  |
| Gross International Reserves 1982                      | 92*                                                           | -4                           | 5                                        | -11               | -14                             | 6                                | -10                                |
| Gross National Product per Capita                      |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| 1982                                                   | 89*                                                           | -13                          | -12                                      | 14                | 5                               | -4                               | 0                                  |
| Total Public External Debt 1970                        | 86*                                                           | 4                            | 36                                       | -3                | -10                             | -5                               | 26                                 |
| Gross Inflow Public Loans 1970                         | 83*                                                           | 8                            | 41                                       | 2                 | -7                              | -1                               | 27                                 |
| Interest Payments on External Debt 1982                | 82*                                                           | -3                           | 6                                        | 1                 | 34                              | 7                                | -2                                 |
| Payment of Principal on Public                         |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| External Loans 1982                                    | 78*                                                           | -3                           | 4                                        | 0                 | 28                              | 13                               | -22                                |
| Gross International Reserves 1970                      | 75*                                                           | -9                           | 12                                       | -18               | 0                               | -12                              | -30                                |
| Gross Inflow Public External Loans 1982                | 71*                                                           | 2                            | 24                                       | 12                | 15                              | 5                                | -25                                |
| Public External Borrowing Commitments                  | 69*                                                           | 0                            | 23                                       | 10                | 9                               | 9                                | -32                                |
| Gross Domestic Product 1982                            | 53*                                                           | -33                          | 27                                       | -6                | -7                              | -14                              | -1                                 |
| Current Account Balance 1982                           | -10*                                                          | 0                            | -28                                      | 5                 | 7                               | -8                               | 14                                 |
| Current Account Balance 1970                           | -87*                                                          | 0                            | 51                                       | 3                 | 2                               | 14                               | -17                                |
| Growth in Exports 1960-70                              | -22                                                           | 95*                          | 8                                        | -4                | -5                              | 1                                | 3                                  |
| Gross Inflow Public External Loans/GDP                 |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| 1982                                                   | -13                                                           | 85*                          | 19                                       | 19                | 16                              | -5                               | -17                                |
| Public Debt as % GDP 1982                              | -12                                                           | 83*                          | 7                                        | 10                | 26                              | -6                               | 7                                  |
| Public Consumption as % GDP 1960                       | 10                                                            | 82*                          | -12                                      | -10               | -22                             | 20                               | -1                                 |
| Public Consumption as % GDP 1982                       | 42                                                            | 68*                          | -10                                      | 4                 | 15                              | -21                              | -2                                 |
| Exports as % GDP 1982                                  | 5                                                             | 65*                          | 3                                        | 0                 | 49                              | -20                              | 0                                  |
| Resource Balance as % GDP 1982                         | 0                                                             | -71*                         | 12                                       | -16               | 53                              | -12                              | 16                                 |
| Payment of Principal on Public                         |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| External Loans 1970                                    | 17                                                            | 5                            | 99*                                      | 1                 | 0                               | -1                               | 15                                 |
| Interest Payments on Public                            |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| External Debt 1970                                     | 21                                                            | 3                            | 95*                                      | -1                | -3                              | -7                               | 15                                 |
| Average Maturity of Public External                    |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| Debt 1982                                              | -10                                                           | 11                           | 45*                                      | -26               | -23                             | 0                                | 13                                 |
| Public Debt/Exports 1982                               | 4                                                             | 1                            | 0                                        | 94*               | -15                             | 10                               | 23                                 |
| Public Borrowing Commitments/Exports                   |                                                               |                              |                                          |                   |                                 |                                  |                                    |
| 1982                                                   | 2                                                             | 6                            | 4                                        | 93*               | -26                             | 11                               | -17                                |
| Gross Inflow Public External Loans/<br>Exports 1982    | 0                                                             | 8                            | 11                                       | 89*               | 1                               | -4                               | -4                                 |
| Growth of Exports 1970-82                              | 36                                                            | 14                           | 22                                       | -41*              | -16                             | 19                               | -9                                 |
| Growth of Public Consumption 1970-82                   | -32                                                           | 9                            | -11                                      | -21               | 70*                             | 24                               | 9                                  |
| Debt Service Public External Debt as %<br>Exports 1982 | 17                                                            | -3                           | 16                                       | -16               | 69*                             | 21                               | -4                                 |
| Private Consumption % GDP 1982                         | -13                                                           | -29                          | 2                                        | -2                | -79*                            | -3                               | -8                                 |
| Growth of Exports 1970-82                              | 0                                                             | 5                            | 14                                       | -9                | 85*                             | 14                               | 23                                 |
| Growth of Private Consumption 1970-82                  | 13                                                            | -14                          | -21                                      | 30                | 15                              | 82*                              | 22                                 |
| Terms of Trade 1982                                    | 6                                                             | 49                           | -13                                      | -4                | 28                              | 47*                              | 3                                  |
| Private Consumption as % GDP 1960                      | -13                                                           | -18                          | 21                                       | 9                 | 3                               | 24                               | 72*                                |
| Public External Debt % GDP 1970                        | 38                                                            | 7                            | 3                                        | -5                | 15                              | 24                               | 59*                                |



Table 23

# Oblique Factor Pattern: Economic Variables, Military Expenditure Per Capita, Group II Countries

| Variables                                               | Factors                                       |                                                             |                                                                       |                                            |                                         |                              |
|---------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------|-----------------------------------------|------------------------------|
|                                                         | 1<br>Determinants<br>of External<br>Debt 1982 | 2<br>Public<br>External<br>Borrowing<br>Commitments<br>1982 | 3<br>Determinants<br>of Military<br>Expenditure<br>Per Capita<br>1981 | 4<br>Growth<br>in<br>Public<br>Consumption | 5<br>Public<br>External<br>Debt<br>1970 | 6<br>Growth<br>in<br>Exports |
| Interest Payments on External<br>Public Debt 1982       | 100*                                          | -6                                                          | 2                                                                     | 10                                         | -15                                     | -4                           |
| Gross Inflow Public Loans 1982                          | 100*                                          | 0                                                           | 2                                                                     | 17                                         | -5                                      | 7                            |
| Total Public External Debt 1982                         | 94*                                           | -1                                                          | 3                                                                     | 4                                          | 15                                      | 4                            |
| Public External Borrowing Commit-<br>ments 1982         | 93*                                           | 2                                                           | -3                                                                    | 34                                         | 7                                       | 1                            |
| Repayment of Principal on Public<br>External Debt 1970  | 76*                                           | 3                                                           | -4                                                                    | -38                                        | 15                                      | 15                           |
| Interest Payments on External Public<br>Debt 1970       | 69*                                           | 3                                                           | -14                                                                   | -36                                        | 26                                      | 7                            |
| Repayment of Principal on Public<br>External Debt 1982  | 69*                                           | -13                                                         | 35                                                                    | 20                                         | 20                                      | -11                          |
| Debt Service on External Debt as %<br>Exports 1982      | 69*                                           | 9                                                           | 30                                                                    | -13                                        | -5                                      | -32                          |
| Resource Balance % GDP 1982                             | 58*                                           | -35                                                         | 9                                                                     | -19                                        | 16                                      | -14                          |
| Current Account Balance 1970                            | -88*                                          | -4                                                          | 11                                                                    | -12                                        | -5                                      | -28                          |
| Public External Borrowing Commit-<br>ments/Exports 1982 | 0                                             | 82*                                                         | -21                                                                   | -1                                         | 1                                       | -15                          |
| Average Maturity Public External Debt<br>1982           | -42                                           | 77*                                                         | -8                                                                    | 1                                          | 29                                      | 9                            |
| Public External Debt/Exports 1982                       | 27                                            | 69*                                                         | -1                                                                    | -45                                        | 19                                      | -13                          |
| Gross Inflow Public Loans/Exports 1982                  | 31                                            | 56*                                                         | 8                                                                     | -33                                        | -12                                     | -9                           |
| Terms of Trade 1982                                     | 43                                            | -51*                                                        | 2                                                                     | 26                                         | 22                                      | -18                          |
| Gross Domestic Product 1982                             | 45                                            | -59*                                                        | -48                                                                   | -10                                        | 17                                      | 9                            |
| GNP Per Capita 1982                                     | 3                                             | -71*                                                        | 18                                                                    | -36                                        | -28                                     | -1                           |
| Gross International Reserves 1982                       | -32                                           | -73*                                                        | -13                                                                   | -14                                        | 29                                      | -24                          |
| Gross International Reserves 1970                       | 0                                             | -77*                                                        | -16                                                                   | -39                                        | 1                                       | 9                            |
| Public Consumption as % GDP 1960                        | -26                                           | -8                                                          | 30*                                                                   | 17                                         | 34                                      | 17                           |
| Public External Debt % GDP 1970                         | 47                                            | 36                                                          | 77*                                                                   | 0                                          | 6                                       | 0                            |
| Exports % GDP 1982                                      | 3                                             | -23                                                         | 68*                                                                   | 31                                         | -9                                      | 28                           |
| Gross Inflow Public External<br>Loans/GDP 1982          | 38                                            | 21                                                          | 66*                                                                   | 14                                         | -17                                     | 14                           |
| Public Consumption % GDP 1982                           | -19                                           | 6                                                           | 60*                                                                   | -23                                        | -25                                     | 12                           |
| Military Expenditures Per Capita<br>1981                | -9                                            | -31                                                         | 57*                                                                   | -39                                        | -14                                     | 32                           |
| Current Account Balance 1982                            | -23                                           | 44                                                          | 48*                                                                   | -9                                         | 43                                      | -2                           |
| Private Consumption as % GDP 1982                       | -21                                           | 20                                                          | -71*                                                                  | 4                                          | -9                                      | 22                           |
| Growth in Imports 1970-82                               | 17                                            | 6                                                           | -13                                                                   | 88*                                        | -8                                      | -4                           |
| Public Consumption Growth 1970-82                       | -2                                            | 35                                                          | 0                                                                     | 81*                                        | 7                                       | 0                            |
| Private Consumption Growth 1970-82                      | 14                                            | -12                                                         | 37                                                                    | 71*                                        | 12                                      | -19                          |
| Net Inflow Public External Loans 1970                   | 20                                            | 1                                                           | 0                                                                     | 3                                          | 90*                                     | 1                            |
| Total Public External Loans 1970                        | 19                                            | 6                                                           | -18                                                                   | -18                                        | 75*                                     | 11                           |
| Public External Debt % GDP 1970                         | 8                                             | 11                                                          | 35                                                                    | 32                                         | 70*                                     | 10                           |
| Gross Inflow Public External Loans<br>1970              | 52                                            | 2                                                           | -2                                                                    | -17                                        | 63*                                     | 8                            |
| Growth in Exports 1960-70                               | -7                                            | -6                                                          | 24                                                                    | 1                                          | 12                                      | 84*                          |
| Growth in Exports 1970-82                               | 21                                            | -7                                                          | 20                                                                    | -34                                        | 1                                       | 82*                          |
| Private Consumption % GDP 1982                          | 13                                            | 29                                                          | -47*                                                                  | 18                                         | 3                                       | 59*                          |



Table 24

Determinants Of Military Expenditures Per Capita,  
Total Country Sample, Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |         |        |        |         |        |        |        |         | Statistics |                |       |    |
|----------|-----------------------|---------|--------|--------|---------|--------|--------|--------|---------|------------|----------------|-------|----|
|          | (MEP81)<br>GNPPER     | CAB     | PCB    | ECNIA  | PDPB    | EGB    | GDPB   | GEDB   | GDB     | PDB        | r <sup>2</sup> | F     | DF |
| 1        | 0.32                  | 0.75    |        |        |         |        |        |        |         |            |                |       |    |
|          | (4.42)                | (10.15) |        |        |         |        |        |        |         |            | .730           | 67.84 | 52 |
| 2        | 0.29                  | 0.75    | 0.21   |        |         |        |        |        |         |            |                |       |    |
|          | (4.60)                | (12.06) | (3.41) |        |         |        |        |        |         |            | .834           | 72.12 | 46 |
| 3        | 0.28                  | 0.79    | 0.22   | 0.19   |         |        |        |        |         |            |                |       |    |
|          | (4.98)                | (13.82) | (3.84) | (3.38) |         |        |        |        |         |            | .869           | 70.06 | 46 |
| 4        | 0.23                  | 0.76    | 0.31   | 0.17   | -0.14   |        |        |        |         |            |                |       |    |
|          | (3.94)                | (13.47) | (4.39) | (3.21) | (-2.06) |        |        |        |         |            | .882           | 61.22 | 46 |
| 5        | 0.26                  | 0.77    | 0.29   | 0.14   | -0.12   | 0.12   |        |        |         |            |                |       |    |
|          | (4.52)                | (14.27) | (4.40) | (2.66) | (-1.86) | (2.29) |        |        |         |            | .896           | 57.19 | 46 |
| 6        | 0.28                  | 0.78    | 0.22   | 0.17   |         |        | 0.03   |        |         |            |                |       |    |
|          | (4.78)                | (12.20) | (3.23) | (2.41) |         |        | (0.43) |        |         |            | .870           | 55.08 | 46 |
| 7        | 0.63                  |         | 0.29   |        |         |        |        | 0.33   |         |            |                |       |    |
|          | (7.71)                |         | (3.09) |        |         |        |        | (3.66) |         |            | .787           | 40.83 | 36 |
| 8        | 0.83                  |         | 0.30   |        |         |        |        |        | -0.28   |            |                |       |    |
|          | (4.91)                |         | (2.56) |        |         |        |        |        | (-1.66) |            | .697           | 27.71 | 39 |
| 9        | 0.28                  | 0.78    | 0.22   |        |         |        |        |        |         | 0.13       |                |       |    |
|          | (4.67)                | (12.71) | (3.69) |        |         |        |        |        |         | (2.11)     | .850           | 59.51 | 46 |
| 10       | 0.22                  | 0.75    | 0.33   |        | -0.17   |        |        |        |         | 0.12       |                |       |    |
|          | (3.61)                | (12.51) | (4.43) |        | (-2.26) |        |        |        |         | (2.13)     | .866           | 53.36 | 46 |

Notes: See text for definition of variables  
 ( ) = t statistic  
 r<sup>2</sup> = correlation coefficient  
 F = F statistic  
 DF = degrees of freedom

Table 25

## Military Expenditures Per Capita, Total Country Sample

| Country          | Actual   | Predicted | Actual/<br>Predicted | Placement |
|------------------|----------|-----------|----------------------|-----------|
| 1. Rwanda        | 3.962    | 113.482   | .0349                | Below     |
| 2. India         | 7.360    | 194.503   | .0378                | Below     |
| 3. Tanzania      | 14.427   | 183.659   | .0786                | Below     |
| 4. Jamaica       | 14.348   | 178.117   | .0806                | Below     |
| 5. Panama        | 13.500   | 138.394   | .0975                | Below     |
| 6. Kenya         | 11.579   | 95.773    | .1209                | Below     |
| 7. Indonesia     | 18.581   | 142.405   | .1305                | Below     |
| 8. Malawi        | 5.968    | 43.122    | .1384                | Below     |
| 9. Liberia       | 18.000   | 124.965   | .1440                | Below     |
| 10. Ethiopia     | 13.600   | 81.351    | .1672                | Below     |
| 11. Ivory Coast  | 13.253   | 62.912    | .2107                | Below     |
| 12. Mexico       | 16.634   | 66.962    | .2484                | Below     |
| 13. Zimbab       | 53.038   | 149.006   | .3559                | Below     |
| 14. Mauritius    | 37.333   | 104.454   | .3574                | Below     |
| 15. El Salvador  | 25.217   | 66.254    | .3806                | Below     |
| 16. Algeria      | 91.959   | 236.599   | .3887                | Below     |
| 17. Morocco      | 50.000   | 126.109   | .3965                | Below     |
| 18. Tunisia      | 34.030   | 69.864    | .4871                | Below     |
| 19. Venezuela    | 62.663   | 118.725   | .5278                | Below     |
| 20. Chile        | 104.911  | 138.791   | .7559                | Below     |
| 21. Argentina    | 111.010  | 143.741   | .7723                | Below     |
| 22. Kuwait       | 836.000  | 987.910   | .8462                | Below     |
| 23. Saudi Arabia | 2110.000 | 2028.000  | 1.0404               |           |
| 24. Jordan       | 273.125  | 243.730   | 1.1206               | Above     |
| 25. Greece       | 265.773  | 220.175   | 1.2071               | Above     |
| 26. Korea        | 103.666  | 76.012    | 1.3638               | Above     |
| 27. Malaysia     | 101.119  | 68.533    | 1.4755               | Above     |
| 28. Uruguay      | 125.172  | 83.365    | 1.5015               | Above     |
| 29. Thailand     | 27.413   | 17.900    | 1.5315               | Above     |
| 30. Peru         | 53.717   | 29.329    | 1.8315               | Above     |
| 31. Israel       | 1151.000 | 585.107   | 1.9672               | Above     |
| 32. Bolivia      | 35.000   | 15.876    | 2.2046               | Above     |
| 33. Spain        | 96.693   | 30.954    | 3.1238               | Above     |
| 34. Ecuador      | 35.663   | 6.120     | 5.8273               | Above     |

## Notes:

Based on regression equation:

$$\text{MEP81} = 0.23\text{GNPPER} + 0.77\text{CA8} + 0.31\text{PCB} + 0.18\text{ECNIA} - 0.15\text{PDPS}$$

(3.21) (13.47) (4.39) (3.21) (2.06)

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

Table 26

Determinants Of Military Expenditures Per Capita,  
Group I Countries' Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |                  |                |                |                |                |                  |                  |      | Statistics     |                |       |    |
|----------|-----------------------|------------------|----------------|----------------|----------------|----------------|------------------|------------------|------|----------------|----------------|-------|----|
|          | (MEP81)<br>GNPPER     | GDB              | PCB            | GEDB           | ECNIA          | PDB            | ECNIB            | CAB              | PBCB | GDP            | r <sup>2</sup> | F     | DF |
| 1        | 0.54<br>(3.63)        |                  |                |                |                |                |                  |                  |      |                | .291           | 13.14 | 33 |
| 2        | 0.58<br>(4.22)        | -0.46<br>(-3.39) |                |                |                |                |                  |                  |      |                | .505           | 13.28 | 28 |
| 3        | 0.74<br>(6.43)        | -0.24<br>(-2.93) | 0.09<br>(0.64) |                |                |                |                  |                  |      |                | .782           | 26.34 | 25 |
| 4        | 0.56<br>(5.99)        | -0.44<br>(-4.65) |                | 0.46<br>(4.87) |                |                |                  |                  |      |                | .807           | 30.75 | 25 |
| 5        | 0.38<br>(4.39)        | -0.30<br>(-3.44) |                | 0.32<br>(3.74) | 0.40<br>(3.77) |                |                  |                  |      |                | .885           | 40.64 | 25 |
| 6        | 0.45<br>(4.63)        | -0.31<br>(-3.10) |                | 0.37<br>(3.94) |                | 0.29<br>(2.45) |                  |                  |      |                | .850           | 29.82 | 25 |
| 7        | 0.37<br>(4.36)        | -0.30<br>(-3.64) |                | 0.31<br>(3.72) | 0.48<br>(4.09) |                | -0.13<br>(-1.64) |                  |      |                | .896           | 34.56 | 25 |
| 8        | 0.44<br>(3.13)        |                  |                |                |                |                |                  | -0.38<br>(-2.64) |      |                | .424           | 11.05 | 32 |
| 9        | 0.25<br>(2.65)        | -0.22<br>(-2.14) |                |                | 0.67<br>(4.67) |                |                  | -0.04<br>(-0.35) |      |                | .788           | 22.32 | 28 |
| 10       | 0.52<br>(3.94)        | -0.47<br>(-3.65) |                |                |                |                |                  |                  |      | 0.28<br>(2.11) | .580           | 11.52 | 28 |

Notes: See text for definition of variables  
 ( ) = t statistic  
 r<sup>2</sup> = correlation coefficient  
 F = F statistic  
 DF = degrees of freedom

the government deficit as a percentage of gross domestic product in 1982 (GDB) is highly significant, but negative. The share of military expenditures in the total government budget (GEDB) is also statistically significant with a positive sign as is the net flow of external loans in 1970.

Group II countries again indicate a pattern different than that of group I countries. The results of the regression for group II countries, Table 27, show that gross domestic product per capita (GNPPER) and the current account of the balance of payment (CAB) account for the majority of the fluctuations in military expenditures per capita. The share of public consumption in 1982 was also statistically significant. It is interesting to note that all measures of external debt were statistically insignificant in accounting for fluctuations in military expenditures per capita. Group II countries therefore appear to maintain a much stronger balance of payments position than do group I countries.

A comparison of the actual versus the predicted value in Table 28 for the group II countries show some improvement over the result obtained from the total country sample. The predicted value for Venezuela is, however, worse than it was in the total country sample.

In summary, the basic regression equation for military expenditures per capita shows the following differences by sample group:

Table 27

Determinants Of Military Expenditures Per Capita,  
Group II Countries' Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |         |        |         |        |        |         |        | Statistics     |        |    |
|----------|-----------------------|---------|--------|---------|--------|--------|---------|--------|----------------|--------|----|
|          | GNPPER                | CAB     | PCB    | PCB     | GEDB   | GDB    | ECNIA   | GDP    | r <sup>2</sup> | F      | DF |
| 1        | MEP81= 0.21           | 0.90    |        |         |        |        |         |        |                |        |    |
|          | (3.15)                | (13.35) |        |         |        |        |         |        | .923           | 102.05 | 19 |
| 2        | 0.19                  | 0.91    | 0.08   |         |        |        |         |        |                |        |    |
|          | (4.73)                | (22.30) | (1.80) |         |        |        |         |        | .979           | 215.33 | 17 |
| 3        | 0.19                  | 0.91    | 0.07   | -0.02   |        |        |         |        |                |        |    |
|          | (4.48)                | (21.31) | (1.53) | (-0.38) |        |        |         |        | .979           | 151.10 | 17 |
| 4        | 0.80                  |         | 0.43   |         | 0.01   |        |         |        |                |        |    |
|          | (8.37)                |         | (4.54) |         | (0.11) |        |         |        | .921           | 35.14  | 12 |
| 5        | 0.56                  |         | 0.34   |         |        | 0.29   |         |        |                |        |    |
|          | (3.17)                |         | (4.34) |         |        | (2.74) |         |        | .953           | 68.13  | 13 |
| 6        |                       |         | 0.43   |         | 0.01   | 0.80   |         |        |                |        |    |
|          |                       |         | (4.54) |         | (0.11) | (8.37) |         |        | .921           | 35.14  | 12 |
| 7        | 0.19                  | 0.91    | 0.06   |         |        |        | -0.03   |        |                |        |    |
|          | (4.48)                | (21.82) | (1.28) |         |        |        | (-0.73) |        | .979           | 156.26 | 17 |
| 8        | 0.19                  | 0.89    | 0.10   |         |        |        |         | 0.04   |                |        |    |
|          | (4.67)                | (19.34) | (2.03) |         |        |        |         | (0.95) | .980           | 160.67 | 17 |

Notes: See text for definition of variables

( ) = t statistic

r<sup>2</sup> = correlation coefficient

F = F statistic

DF = degrees of freedom

### Military Expenditures Per Capita, Group II Countries

|     | Country       | Actual   | Predicted | Actual/<br>Predicted | Placement |
|-----|---------------|----------|-----------|----------------------|-----------|
| 1.  | Rwanda        | 3.962    | 164.274   | .0241                | Below     |
| 2.  | India         | 7.360    | 64.386    | .1143                | Below     |
| 3.  | Columbia      | 13.759   | 110.325   | .1247                | Below     |
| 4.  | Indonesia     | 18.581   | 147.319   | .1261                | Below     |
| 5.  | Mexico        | 16.634   | 110.519   | .1505                | Below     |
| 6.  | Thailand      | 27.413   | 136.867   | .2003                | Below     |
| 7.  | Philippines   | 16.792   | 52.817    | .3179                | Below     |
| 8.  | Algeria       | 91.959   | 222.219   | .4138                | Below     |
| 9.  | Venezuela     | 62.663   | 130.375   | .4806                | Below     |
| 10. | Spain         | 96.693   | 133.193   | .7260                | Below     |
| 11. | Argentina     | 111.010  | 127.112   | .8733                | Below     |
| 12. | Kuwait        | 836.000  | 870.248   | .9606                |           |
| 13. | Korea         | 103.666  | 105.488   | .9827                |           |
| 14. | Saudia Arabia | 2110.000 | 1956.000  | 1.0787               | Above     |
| 15. | Malaysia      | 101.119  | 74.901    | 1.3500               | Above     |
| 16. | Greece        | 265.773  | 194.039   | 1.3697               | Above     |
| 17. | Jordon        | 273.125  | 189.901   | 1.4382               | Above     |
| 18. | Syria         | 267.802  | 183.639   | 1.4583               | Above     |

Notes:

Based on regression equation:  $MEP81 = 0.21GNPPER + 0.91CA8$   
(3.15) (13.35)

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

|          | GNPPER | CAB | PCB | PDB | GDB | GEDB | PDA |
|----------|--------|-----|-----|-----|-----|------|-----|
| Total    | +      | +   | +   | +   | 0   | +    | 0   |
| Group I  | +      | -   | 0   | +   | -   | +    | 0   |
| Group II | +      | +   | 0   | 0   | +   | 0    | 0   |

Figure 12 - Summary Of Regression Equation For Military Expenditures Per Capita

Notes: + = Statistically Significant With A Positive Sign At The 95% Level  
 - = Statistically Significant With A Negative Sign At The 95% Level  
 0 = Statistically Insignificant

The third measure of military expenditure examined was military expenditures as a percentage of gross national product. A factor analysis was run for the total country sample, group I countries and then for the group II countries. The results of these were similar to those of the previous two, in that there was an improvement in the military expenditure loading when the countries were split into two groups.

The factor analysis for the total country sample, Table 29, loaded moderately well on factor 2. This factor consists of public consumption as a percentage of gross domestic product and several other measures of public external debt in



Table 29

Oblique Rotated Factor Pattern: Economic Variables,  
Military Expenditures As % GNP, Total Country Sample

| Variables                                            | Factors                          |                               |                              |                                        |                            |                   |                                        |
|------------------------------------------------------|----------------------------------|-------------------------------|------------------------------|----------------------------------------|----------------------------|-------------------|----------------------------------------|
|                                                      | 1<br>Overall<br>External<br>Debt | 2<br>Military<br>Expenditures | 3<br>Per<br>Capita<br>Income | 4<br>External<br>Debt/<br>Exports 1982 | 5<br>Growth<br>Consumption | 6<br>Debt<br>1982 | 7<br>External<br>Debt/<br>Exports 1982 |
| Repayment of Principal on External Public Loans 1970 | 100*                             | -5                            | -5                           | 0                                      | -27                        | 8                 | -5                                     |
| Interest Payments on External Public Loans 1970      | 98*                              | -10                           | -1                           | 5                                      | -25                        | 2                 | 3                                      |
| External Public Debt 1982                            | 95*                              | 2                             | -1                           | 3                                      | 11                         | 14                | 7                                      |
| Gross Inflow Public Loans 1982                       | 92*                              | 3                             | -4                           | 1                                      | 15                         | 12                | -10                                    |
| Gross Inflow Public Loans 1970                       | 90*                              | -1                            | 4                            | 3                                      | -7                         | 6                 | 37                                     |
| Public Borrowing Commitments 1982                    | 87*                              | -1                            | -3                           | 7                                      | 26                         | 3                 | -3                                     |
| Interest Payments on External Public Debts 1982      | 86*                              | 0                             | -1                           | 0                                      | 12                         | 23                | -12                                    |
| External Public Debt 1970                            | 76*                              | -5                            | 1                            | 7                                      | -10                        | -10               | 46                                     |
| Repayment of Principal on External Debt 1982         | 61*                              | 2                             | 16                           | -3                                     | 26                         | 37                | 15                                     |
| Gross Domestic Product 1982                          | 56*                              | -13                           | 41                           | 0                                      | 5                          | -27               | -12                                    |
| Growth in Exports 1970-82                            | 44*                              | 24                            | 2                            | -38                                    | -15                        | -18               | -7                                     |
| Current Account Balance 1970                         | -87*                             | -15                           | 17                           | 7                                      | -10                        | 4                 | -8                                     |
| Growth in Exports 1960-70                            | 15                               | 86*                           | -14                          | -5                                     | 5                          | -40               | -9                                     |
| Public Consumption as % of GDP 1982                  | -2                               | 81*                           | 14                           | 2                                      | -17                        | 10                | 17                                     |
| Gross Inflow Public Loans/GDP 1982                   | 7                                | 78*                           | 1                            | 29                                     | -3                         | 4                 | -12                                    |
| External Public Debt as % of GDP 1982                | 4                                | 72*                           | -12                          | 17                                     | -11                        | 21                | 4                                      |
| Public Consumption as % of GNP 1960                  | -11                              | 72*                           | -4                           | -9                                     | 12                         | -9                | 32                                     |
| Exports as % of GDP 1982                             | -8                               | 70*                           | 21                           | -7                                     | 8                          | 26                | -5                                     |
| Military Expenditures/GNP 1981                       | 8                                | 65*                           | 12                           | -17                                    | -3                         | -7                | 43                                     |
| Resource Balance as % of GDP 1982                    | 21                               | -58*                          | 13                           | -25                                    | -8                         | 54                | -3                                     |
| Gross International Reserves 1982                    | -6                               | -9                            | 88*                          | 0                                      | 12                         | -16               | 9                                      |
| GNP per Capita 1982                                  | -5                               | 13                            | 83*                          | -1                                     | -13                        | 12                | -1                                     |
| Gross International Reserves 1970                    | 15                               | 0                             | 80*                          | -10                                    | -11                        | -19               | -14                                    |
| Current Account Balance 1982                         | -21                              | 0                             | -46                          | 8                                      | -12                        | 31                | 27                                     |
| Private Consumption as % of GDP 1970                 | 22                               | -11                           | -64*                         | -4                                     | 8                          | -33               | -3                                     |
| Average Maturity External Debt 1982                  | -7                               | 5                             | -65*                         | -8                                     | 1                          | -21               | 33                                     |
| Public Borrowing Commitments (External)/Exports 1982 | 2                                | 0                             | -3                           | 96*                                    | 4                          | -20               | -7                                     |
| Gross Inflow Public Loans/Exports 1982               | 6                                | 10                            | 10                           | 89*                                    | -6                         | 1                 | -12                                    |
| External Public Debt/Exports 1982                    | 4                                | 1                             | -7                           | 88*                                    | -3                         | -3                | 9                                      |
| Growth in Private Sector Consumption 1970-82         | -9                               | -7                            | 9                            | 22                                     | 85*                        | 9                 | 18                                     |
| Growth in Imports 1970-82                            | 13                               | -2                            | -1                           | -8                                     | -22                        | -4                | -7                                     |
| Growth in Public Consumption 1970-82                 | 2                                | 3                             | -22                          | -17                                    | 69*                        | 1                 | -7                                     |
| Debt Service as % of Exports 1982                    | 22                               | -1                            | -5                           | -5                                     | -5                         | 75*               | 17                                     |
| Private Sector Consumption as % of GDP 1982          | -13                              | -33                           | -37                          | 2                                      | -23                        | -44*              | -4                                     |
| Net Inflow Public External Loans 1970                | 67                               | 2                             | 11                           | 6                                      | 8                          | 3                 | 63*                                    |
| External Public Debt as % of GDP 1970                | 2                                | 12                            | -27                          | -4                                     | 4                          | 37                | 59*                                    |

1982. The export position of the country was also an important element contained in this factor.

Group I countries, in Table 30, loaded much higher on factor 1 which is comprised of several measures of public external debt in both 1970 and 1982. This is consistent with the previous two factor analysis of group I countries.

The factor analysis for the group II countries, Table 31, shows a relatively high loading in factors 3 and 6. Factor 3 contains several measures of public consumption as a percentage of gross domestic product together with several measures of public external debt in 1982. Factor 6 contains several measures of the countries position in exports.

A step wise regression for the total country sample, Table 32, indicates that approximately 60 percent of the fluctuations in military expenditures as a percentage of gross national product can be explained by two variables. The variables are the share of public consumption in gross domestic product in 1982 (PCB) and the share of military expenditures in the total government budget (GEDB). Gross domestic savings as a percentage of gross domestic product for 1982 (GDSB) is also statistically significant but with a negative sign.

A comparison of actual values versus predicted values using equation 8 from Table 32 is shown in Table 33. While Table 33 indicates an improvement in the overall total

Table 30

Oblique Factor Pattern: Economic Variables, Military Expenditures As % Of GNP, Group I Countries

| Variables                                            | Factors          |                  |                  |                  |                  |                  |                  |
|------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
|                                                      | 1                | 2                | 3                | 4                | 5                | 6                | 7                |
| Determinants                                         | Public Debt 1942 | Public Debt 1942 | Public Debt 1942 | Public Debt 1942 | Public Debt 1942 | Public Debt 1942 | Public Debt 1942 |
| Net Inflow Public External Loans 1970                | 94*              | 6                | 3                | 5                | -8               | -1               | 28               |
| Public External Debt 1982                            | 94*              | -4               | 15               | -10              | 10               | 11               | 2                |
| Gross International Reserves 1982                    | 91*              | -5               | -10              | 2                | -13              | 6                | -8               |
| Public External Debt 1970                            | 84*              | 3                | -2               | 30               | -10              | -5               | 26               |
| GDP per Capita 1982                                  | 84*              | -13              | 15               | -11              | 7                | -4               | 3                |
| Gross Inflow External Loans 1970                     | 84*              | 7                | 2                | 36               | -7               | -1               | 28               |
| Interest Payments on External Debt 1982              | 81*              | -5               | 1                | 2                | 34               | 6                | -1               |
| Repayment of Principal on Public External Loans 1982 | 82*              | -5               | 0                | 0                | 28               | 12               | -21              |
| Gross International Reserves 1970                    | 84*              | -10              | -18              | 4                | -1               | -12              | -28              |
| Military Expenditures as % GDP 1961                  | 74*              | 32               | -9               | -24              | -19              | 3                | 0                |
| Gross Inflow Public Loans 1982                       | 74*              | 2                | 12               | 21               | 5                | 5                | -24              |
| Public External Borrowing Commitments 1982           | 71*              | 0                | 10               | 20               | 8                | 9                | -32              |
| Gross Domestic Product 1982                          | 54*              | -33              | -7               | 22               | -4               | -13              | -2               |
| Current Account Balance 1982                         | 76*              | 1                | 5                | -24              | 7                | -8               | 12               |
| Current Account Balance 1970                         | 44*              | 1                | 2                | 51               | 1                | 15               | -14              |
| Growth in Exports 1960-70                            | -23              | 96*              | -4               | 9                | -3               | 1                | 2                |
| Gross Inflow Public Loans/GDP 1982                   | -12              | 85*              | 19               | 21               | 19               | -4               | -17              |
| Public External Debt % GDP 1982                      | -14              | 82*              | 10               | 8                | 29               | -5               | 7                |
| Public Consumption % GDP 1960                        | 4                | 81*              | -18              | -12              | -19              | 12               | -1               |
| Public Consumption % GDP 1982                        | 41               | 67*              | 4                | -13              | 16               | -21              | -2               |
| Exports % GDP 1982                                   | 3                | 63*              | 0                | 4                | 53               | -21              | 2                |
| Resource Balance % GDP 1982                          | -1               | -72*             | -17              | 12               | 51               | -11              | 16               |
| Public Debt Exports 1982                             | 3                | 1                | 94*              | -1               | -16              | 10               | 22               |
| Public External Borrowing Commitments/Exports 1982   | 3                | 6                | 94*              | 5                | -26              | 11               | -19              |
| Gross Inflow Public Loans/Exports 1982               | 0                | 9                | 94*              | 12               | 1                | -4               | -4               |
| Growth in Exports 1970-82                            | 37               | 17               | -41*             | 25               | -14              | 19               | -6               |
| Repayment of Principal on Public External Loans 1970 | 24               | 6                | 0                | 95*              | 0                | 0                | 14               |
| Interest Paid on Public External Debt 1970           | 28               | 3                | -1               | 90*              | -4               | -6               | 14               |
| Average Maturity of Public External Debt             | -12              | 9                | -25              | -48*             | -23              | 0                | 11               |
| Debt Service on External Debt as % Exports 1980      | 21               | -5               | -16              | 13               | 69*              | 21               | -5               |
| Growth in Public Consumption 1970-82                 | -31              | 2                | -22              | -10              | 68*              | 25               | 7                |
| Private Consumption % GDP 1982                       | -12              | -28              | -1               | 1                | -81*             | -3               | -9               |
| Growth in Imports 1970-82                            | 0                | 6                | -9               | 17               | 86*              | 86*              | 24               |
| Growth in Private Consumption 1970-82                | 12               | -14              | 30               | -20              | 15               | 81*              | 22               |
| Terms of Trade 1982                                  | 6                | 47               | -3               | -12              | 30               | 47*              | 3                |
| Private Consumption % GDP 1960                       | -36              | -17              | 8                | 21               | 1                | 25               | 71*              |
| Public External Debt % GDP 1970                      | 46               | 5                | -5               | 0                | 16               | 23               | 58*              |

Table 31

**Oblique Rotated Factor Pattern: Economic Variables,  
Military Expenditures As % Of GNP, Group II Countries**

| Variables                                       | Factors                                     |                                          |                                                        |                                            |                                         |                              |
|-------------------------------------------------|---------------------------------------------|------------------------------------------|--------------------------------------------------------|--------------------------------------------|-----------------------------------------|------------------------------|
|                                                 | 1<br>Factors<br>Total<br>Exports<br>1941-42 | 2<br>Factors<br>Total<br>Exports<br>1945 | 3<br>Factors<br>Military<br>Expenditures<br>% GDP 1945 | 4<br>Growth<br>in<br>Public<br>Consumption | 5<br>Public<br>External<br>Debt<br>1970 | 6<br>Growth<br>in<br>Exports |
| Interest Payments on External Debt 1982         | 100*                                        | -6                                       | 0                                                      | 10                                         | -14                                     | -5                           |
| Gross Inflow Public Loans 1982                  | 100*                                        | 0                                        | 2                                                      | 16                                         | -4                                      | 7                            |
| Total Public External Debt 1982                 | 73*                                         | -1                                       | 3                                                      | 4                                          | 15                                      | 3                            |
| Public External Borrowing Commitments 1982      | 42*                                         | 3                                        | -11                                                    | 34                                         | 10                                      | 1                            |
| Payment of Principal on External Loans 1970     | 75*                                         | 2                                        | -3                                                     | -40                                        | 16                                      | 16                           |
| Payment of Principal on External Loans 1982     | 63*                                         | -12                                      | 34                                                     | 20                                         | 18                                      | -14                          |
| Debt Service % of Exports 1982                  | 68*                                         | 9                                        | 28                                                     | -11                                        | -5                                      | -34                          |
| Interest Payments on External Debt 1970         | 67*                                         | 2                                        | -13                                                    | -36                                        | 28                                      | 9                            |
| Current Account Balance 1982                    | 54*                                         | -40                                      | 10                                                     | -21                                        | 15                                      | -14                          |
| Current Account Balance 1970                    | -88*                                        | -5                                       | 12                                                     | -14                                        | -7                                      | -26                          |
| Public Borrowing Commitments/Exports 1982       | 0                                           | 84*                                      | -22                                                    | 1                                          | 1                                       | -13                          |
| Average Maturity of External Debt 1982          | -11                                         | 78*                                      | -7                                                     | 1                                          | 27                                      | 6                            |
| Public External Debt/Exports 1982               | 26                                          | 69*                                      | -1                                                     | -42                                        | 20                                      | -15                          |
| Gross Inflow Public External Loans Exports 1982 | 51                                          | 60*                                      | 7                                                      | -29                                        | -11                                     | -8                           |
| Terms of Trade 1982                             | 42                                          | -48*                                     | 1                                                      | 32                                         | 27                                      | -20                          |
| Gross Domestic Product 1982                     | 44                                          | -58*                                     | -47                                                    | -10                                        | 21                                      | 9                            |
| Gross National Product per Capita 1982          | 3                                           | -71*                                     | 13                                                     | -34                                        | -28                                     | -3                           |
| Gross International Reserves 1982               | -33                                         | -72*                                     | -11                                                    | -15                                        | 29                                      | -25                          |
| Gross International Reserves 1970               | -1                                          | -79*                                     | -14                                                    | -44                                        | 0                                       | 12                           |
| Public Consumption % GDP 1960                   | -24                                         | -8                                       | 78*                                                    | 15                                         | 27                                      | 14                           |
| Public External Debt % GDP 1982                 | 48                                          | 24                                       | 78*                                                    | -5                                         | 1                                       | 2                            |
| Exports as % GDP 1982                           | 5                                           | -25                                      | 70*                                                    | 23                                         | -15                                     | 32                           |
| Gross Inflow Public Loans/GDP 1982              | 30                                          | 18                                       | 69*                                                    | 9                                          | -20                                     | 13                           |
| Military Expenditures % GNP 1981                | -20                                         | -9                                       | 68*                                                    | -2                                         | 16                                      | 63                           |
| Public Consumption % GDP 1982                   | -19                                         | 4                                        | 57*                                                    | -24                                        | -28                                     | 15                           |
| Current Account Balance 1982                    | -21                                         | 45                                       | 47*                                                    | -9                                         | 18                                      | -7                           |
| Private Consumption as % GDP 1982               | -20                                         | 22                                       | -74*                                                   | 9                                          | -5                                      | 18                           |
| Growth in Imports 1970-82                       | 19                                          | 9                                        | -14                                                    | 92*                                        | -6                                      | -9                           |
| Growth in Public Consumption 1970-82            | 0                                           | 37                                       | 3                                                      | 81*                                        | 7                                       | 0                            |
| Growth in Private Consumption 1970-82           | 15                                          | -11                                      | 39                                                     | 70*                                        | 10                                      | -20                          |
| Net Inflow of Public External Loans 1970        | 18                                          | 4                                        | 2                                                      | 6                                          | 92*                                     | -1                           |
| Total Public External Debt 1970                 | 17                                          | 8                                        | -14                                                    | -18                                        | 79*                                     | 12                           |
| Public External Debt % GDP 1970                 | 8                                           | 14                                       | 37                                                     | 32                                         | 69*                                     | 7                            |
| Gross Inflow Public Loans 1970                  | 50                                          | 3                                        | 0                                                      | -17                                        | 65*                                     | 7                            |
| Growth in Exports 1970-82                       | 23                                          | -0                                       | 18                                                     | -40                                        | 1                                       | 81*                          |
| Growth in Exports 1960-70                       | -4                                          | -7                                       | 20                                                     | -2                                         | 5                                       | 80*                          |
| Private Consumption % GDP 1960                  | 14                                          | 31                                       | -49                                                    | 19                                         | 5                                       | 58*                          |

Table 32

Determinants Of Military Expenditures Per Gross National  
Product, Total Country Sample, Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |                |                  |                |                  |                |                | Statistics     |       |    |
|----------|-----------------------|----------------|------------------|----------------|------------------|----------------|----------------|----------------|-------|----|
|          | PCB                   | GEDB           | GDSB             | GNPPER         | GDB              | PDB            | DSGB           | r <sup>2</sup> | F     | DF |
| 1        | MEY81= 0.60<br>(5.09) |                |                  |                |                  |                |                | .351           | 25.97 | 48 |
| 2        |                       | 0.68<br>(5.96) |                  |                |                  |                |                | .464           | 35.43 | 42 |
| 3        | 0.35<br>(2.81)        | 0.51<br>(4.08) |                  |                |                  |                |                | .603           | 39.31 | 42 |
| 4        | 0.33<br>(2.71)        | 0.48<br>(3.86) | -0.20<br>(-1.90) |                |                  |                |                | .642           | 20.34 | 37 |
| 5        | 0.48<br>(4.39)        | 0.50<br>(4.61) |                  | 0.02<br>(0.17) |                  |                |                | .714           | 27.56 | 36 |
| 6        | 0.43<br>(4.24)        | 0.46<br>(4.61) | -0.24<br>(-2.55) | 0.09<br>(1.02) |                  |                |                | .763           | 25.76 | 36 |
| 7        | 0.37<br>(2.76)        | 0.50<br>(4.60) |                  | 0.22<br>(1.25) | -0.24<br>(-1.40) |                |                | .732           | 21.14 | 35 |
| 8        | 0.45<br>(4.36)        | 0.43<br>(4.24) | -0.28<br>(-2.83) | 0.10<br>(1.15) |                  | 0.11<br>(1.20) |                | .774           | 21.19 | 36 |
| 9        | 0.27<br>(2.20)        | 0.49<br>(4.04) | -0.25<br>(-2.34) |                |                  |                | 0.18<br>(1.70) | .671           | 16.84 | 37 |

Notes: See text for definition of variables  
 ( ) = t statistic  
 r<sup>2</sup> = correlation coefficient  
 F = F statistic  
 DF = degrees of freedom

Table 33

Military Expenditures Per Gross National  
Product, Total Country Sample

|     | Country        | Actual | Predicted | Actual/<br>Predicted | Placement |
|-----|----------------|--------|-----------|----------------------|-----------|
| 1.  | Ivory Coast    | 1.330  | 3.765     | .3533                | Below     |
| 2.  | Senegal        | 2.261  | 6.364     | .3553                | Below     |
| 3.  | Rwanda         | 1.657  | 3.932     | .4214                | Below     |
| 4.  | Pakistan       | 5.836  | 12.210    | .4780                | Below     |
| 5.  | Bolivia        | 2.875  | 5.940     | .4840                | Below     |
| 6.  | Car            | 2.068  | 4.081     | .5067                | Below     |
| 7.  | Ecuador        | 2.252  | 3.521     | .6396                | Below     |
| 8.  | Sudan          | 2.378  | 4.497     | .6399                | Below     |
| 9.  | El Salvador    | 3.323  | 5.147     | .6456                | Below     |
| 10. | Kenya          | 3.056  | 4.018     | .7606                | Below     |
| 11. | Korea          | 6.677  | 8.300     | .8045                | Below     |
| 12. | Argentina      | 2.646  | 3.197     | .8277                | Below     |
| 13. | Chile          | 3.716  | 4.441     | .8367                | Below     |
| 14. | Paraguay       | 1.395  | 1.655     | .8417                | Below     |
| 15. | Morocco        | 7.152  | 7.992     | .8903                | Below     |
| 16. | Thailand       | 3.811  | 4.164     | .9152                | Below     |
| 17. | Liberia        | 3.871  | 4.079     | .9490                | Below     |
| 18. | Malawi         | 2.970  | 3.102     | .9519                |           |
| 19. | Uruguay        | 3.149  | 3.293     | .9563                |           |
| 20. | India          | 3.117  | 3.251     | .9588                |           |
| 21. | Peru           | 4.787  | 4.920     | .9729                |           |
| 22. | Dominican Rep. | 1.500  | 1.489     | 1.0074               |           |
| 23. | Ghana          | .5071  | .5017     | 1.0106               |           |
| 24. | Tanzania       | 5.304  | 4.595     | 1.1542               | Above     |
| 25. | Philippines    | 2.209  | 1.912     | 1.1553               | Above     |
| 26. | Tunisia        | 2.731  | 2.319     | 1.1777               | Above     |
| 27. | Zimbab         | 6.554  | 5.292     | 1.2385               | Above     |
| 28. | Israel         | 20.274 | 16.342    | 1.2406               | Above     |
| 29. | Malaysia       | 6.023  | 3.964     | 1.5194               | Above     |
| 30. | Costa Rica     | 0.5978 | 0.3207    | 1.7457               | Above     |
| 31. | Indonesia      | 3.476  | 1.938     | 1.7936               | Above     |
| 32. | Jordon         | 21.720 | 11.815    | 1.8383               | Above     |
| 33. | Kuwait         | 3.865  | 1.135     | 3.4052               | Above     |
| 34. | Venezuela      | 1.555  | 0.2805    | 5.5439               | Above     |

## Notes:

Based on regression equation:  $MEY81 = 0.27PCB + 0.49GEDB - 0.25GDSB + 0.18DSGB$   
(2.20) (4.04) (-2.35) (1.71)

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

country sample, the predicted value for Venezuela was quite low, less than 20 percent of the actual value.

A step wise regression for group I countries, Table 34, indicate they follow a similar pattern to that observed in the analysis of total military expenditures and military expenditures per capita. These countries tend to resort to public external sources (PDB) and governments deficits (GDB) for the financing of military expenditures. The gross domestic product per capita (GNPPER) is also statistically significant while gross domestic savings as a percentage of gross domestic product in 1982 is not. As with the other measures of military expenditures, there is a large improvement in the correlation coefficient for group I countries over that obtained in the total sample.

A step wise regression for group II countries, Table 35, again differs from those in group I in that external debt and government deficits do not play a significant role in measuring the amount of military expenditures as a percentage of gross national product. The share of government expenditures in gross domestic product in 1981 (GETYB) and the share of military expenditures in the total government budget along with gross domestic savings as a percentage of gross domestic product in 1982 which has a negative sign, account for nearly 90 percent of the fluctuations in military expenditures as a percentage of gross domestic product.



Table 34

Determinants Of Military Expenditures Per Gross National  
Product, Group I Countries Economic Variables

(Standardized Estimates)

| Equation | Independent Variables |        |        |         |         |        | Statistics     |       |    |
|----------|-----------------------|--------|--------|---------|---------|--------|----------------|-------|----|
|          | PCB                   | GEDB   | GNPPER | GDSB    | GDB     | PDB    | r <sup>2</sup> | F     | DF |
| 1 MEY81= | 0.65                  |        |        |         |         |        |                |       |    |
|          | (4.61)                |        |        |         |         |        | .423           | 21.23 | 30 |
| 2        | 0.42                  | 0.40   | 0.28   |         |         |        |                |       |    |
|          | (4.50)                | (3.81) | (3.21) |         |         |        | .903           | 61.84 | 23 |
| 3        | 0.44                  | 0.34   | 0.32   | -0.11   |         |        |                |       |    |
|          | (4.82)                | (2.99) | (3.57) | (-1.45) |         |        | .912           | 49.52 | 23 |
| 4        | 0.19                  | 0.43   | 0.34   |         | -0.26   |        |                |       |    |
|          | (2.18)                | (5.28) | (4.94) |         | (-3.86) |        | .949           | 82.56 | 22 |
| 5        | 0.37                  | 0.33   | 0.20   | -0.08   |         | 0.20   |                |       |    |
|          | (4.04)                | (3.18) | (2.06) | (-1.25) |         | (2.02) | .928           | 46.94 | 23 |

Notes: See text for definition of variables  
 ( ) = t statistic  
 r<sup>2</sup> = correlation coefficient  
 F = F statistic  
 DF = degrees of freedom

Table 35

Determinants Of Military Expenditures Per Gross National  
Product, Group II Countries' Economic Variables

(Standardized Estimates)

| Equation | Independent Variables  |                |                  |                  | Statistics     |       |    |
|----------|------------------------|----------------|------------------|------------------|----------------|-------|----|
|          | GETYB                  | GEDB           | GDSB             | GNPPER           | r <sup>2</sup> | F     | DF |
| 1        | MEY81 = 0.62<br>(2.99) |                |                  |                  | .301           | 8.95  | 15 |
| 2        |                        | 0.70<br>(3.45) |                  |                  | .491           | 12.58 | 14 |
| 3        | 0.48<br>(3.10)         | 0.58<br>(3.71) |                  |                  | .718           | 15.31 | 14 |
| 4        | 0.43<br>(4.27)         | 0.44<br>(4.16) | -0.54<br>(-5.03) |                  | .899           | 29.70 | 13 |
| 5        | 0.49<br>(2.93)         | 0.57<br>(3.32) |                  | -0.03<br>(-0.20) | .719           | 9.40  | 14 |

Notes: See text for definition of variables  
 ( ) = t statistic  
 r<sup>2</sup> = correlation coefficient  
 F = F statistic  
 DF = degrees of freedom

A comparison of actual values versus predicted values using equation 4 from Table 35 is shown in Table 36. The predicted values show a great improvement over those for the total country sample with Venezuela being within 8 percent of the actual value.

In summary the basic regression equation for military expenditures as a percentage of gross national product shows the following differences by sample group:

|          | PCB | GEDB | GNPPER | GDGB | DSGB | PDB | GDB |
|----------|-----|------|--------|------|------|-----|-----|
| Total    | +   | +    | 0      | -    | +    | 0   | 0   |
| Group I  | +   | +    | +      | 0    | 0    | +   | -   |
| Group II | +   | +    | 0      | -    | 0    | 0   | 0   |

Figure 13 - Summary Of Regression Equation For Military Expenditures As A Percentage Of Gross National Product

Notes: + = Statistically Significant With A Positive Sign At The 95% Level  
 - = Statistically Significant With A Negative Sign At The 95% Level  
 0 = Statistically Insignificant

The fourth measure of military expenditure examined was the share of military expenditures in the total government budget. This was analyzed using the total country sample,

### Military Expenditures Per Gross National Product, Group II Countries

Below = Countries whose Actual is less than 95% of Predicted value  
Above = Countries whose Actual is greater than 105% of Predicted value

followed by a similar analysis of group I and group II countries.

The factor results for the total country sample, Table 37, show that this measure of military expenditures loads fairly high on one factor, export growth. It however, has little correlation with other main trends in the data.

The group I countries, Table 38, again load heavily on factor 2, one which includes a number of debt variables. These variables are the total external public debts in 1970 and 1982, and several measures of the inflow of external loans. The gross national product per capita is also included in this factor.

The group II countries, Table 39, load heavily on factor 5. As with other measures of military expenditures, this factor does not contain debt variables. Factor 5 consists mainly of the effects of export growth.

A step wise regression for the total country sample, Table 40, indicated that patterns in military expenditures in the government budget tend to be rather stable when taken as a share of the total government budget, i.e. the share of military expenditures in the total government budget for 1971 (GEDA) was highly significant in explaining the level of military expenditures in the total government budget for 1981 (GEDB).

Table 37

Oblique Rotated Factor Pattern: Economic Variables,  
% Defense Expenditure In Total Government Budget,  
Total Sample

| Variables                                                                | Factors                                               |                                                            |                          |                                                                              |                      |                                          |
|--------------------------------------------------------------------------|-------------------------------------------------------|------------------------------------------------------------|--------------------------|------------------------------------------------------------------------------|----------------------|------------------------------------------|
|                                                                          | 1<br>Factors<br>Facilitating<br>Public<br>Consumption | 2<br>Factors<br>Influencing<br>Total External<br>Debt 1982 | 3<br>Foreign<br>Reserves | 4<br>Factors<br>Influencing<br>Size of<br>Military Expen.<br>in Govt. Budget | 5<br>Debt in<br>1982 | 6<br>Growth in<br>Private<br>Consumption |
| Gross Inflow Public Loans as %<br>of GDP 1982                            | 99*                                                   | 0                                                          | -1                       | -5                                                                           | -4                   | 6                                        |
| Resource Balance as % of GDP<br>1982                                     | 96*                                                   | 1                                                          | -8                       | -6                                                                           | -4                   | 5                                        |
| Gross Inflow Public Loans as %<br>of Exports 1982                        | 98*                                                   | 14                                                         | 7                        | -20                                                                          | 7                    | -3                                       |
| Public Borrowing Commitments as %<br>of Exports 1982                     | 98*                                                   | 2                                                          | -5                       | -8                                                                           | -2                   | 5                                        |
| Public Debt as % of Exports 1982                                         | 97*                                                   | 0                                                          | -6                       | -6                                                                           | -6                   | 7                                        |
| Growth in Public Consumption 1970-82                                     | 83*                                                   | 6                                                          | -8                       | -3                                                                           | -13                  | 32                                       |
| Public Consumption as % of GDP 1982                                      | 82*                                                   | -6                                                         | 11                       | 26                                                                           | 33                   | -8                                       |
| Public Consumption as % of GDP 1960                                      | 70*                                                   | -13                                                        | -7                       | 26                                                                           | 7                    | 17                                       |
| External Public Debt as % of GDP<br>1970                                 | 68*                                                   | 5                                                          | -26                      | 20                                                                           | 16                   | -2                                       |
| Terms of Trade 1982                                                      | -78*                                                  | 21                                                         | 12                       | 7                                                                            | 14                   | 11                                       |
| Private Consumption as % of GDP<br>1982                                  | -83*                                                  | -13                                                        | -23                      | -5                                                                           | -30                  | -9                                       |
| Private Consumption as % of GDP<br>1960                                  | 59*                                                   | 10                                                         | -28                      | 21                                                                           | -7                   | -1                                       |
| External Public Debt 1982                                                | -1                                                    | 98*                                                        | -2                       | 0                                                                            | 7                    | 14                                       |
| Interest Payments on External Public<br>Debt 1970                        | 9                                                     | 94*                                                        | 2                        | -12                                                                          | -1                   | -29                                      |
| Repayment of Principal on External<br>Public Loans 1970                  | 8                                                     | 94*                                                        | 2                        | -12                                                                          | 10                   | -28                                      |
| Gross Inflow Public Loans 1982                                           | -4                                                    | 94*                                                        | -3                       | -8                                                                           | 10                   | 24                                       |
| Public Borrowing Commitments 1982                                        | -6                                                    | 92*                                                        | 4                        | -4                                                                           | -1                   | 31                                       |
| Gross Inflow Public Loans 1970                                           | 6                                                     | 91*                                                        | 5                        | 17                                                                           | -4                   | -22                                      |
| Interest Payments on Public Debt<br>1982                                 | -2                                                    | 90*                                                        | -1                       | -15                                                                          | 19                   | 22                                       |
| Repayment of Principal on Public<br>Loans 1982                           | -3                                                    | 86*                                                        | 8                        | 1                                                                            | 21                   | 19                                       |
| External Public Debt 1970                                                | 9                                                     | 74*                                                        | 2                        | 23                                                                           | -23                  | -31                                      |
| Net Inflow Public External Loans<br>1970                                 | 4                                                     | 73*                                                        | 7                        | 37                                                                           | -15                  | -14                                      |
| Current Account Balance 1970                                             | 7                                                     | 88*                                                        | 15                       | -27                                                                          | -4                   | -15                                      |
| Gross International Reserves 1982                                        | 4                                                     | -9                                                         | 91*                      | 4                                                                            | -30                  | 7                                        |
| Gross International Reserves 1970                                        | 5                                                     | 4                                                          | 91*                      | 1                                                                            | -18                  | -2                                       |
| Gross National Product Per Capita<br>1982                                | -1                                                    | -11                                                        | 83*                      | 10                                                                           | 27                   | -6                                       |
| Gross Domestic Product 1982                                              | 1                                                     | 50                                                         | 52*                      | -7                                                                           | -33                  | 5                                        |
| Average Maturity of External Public<br>Debt 1982                         | 23                                                    | -10                                                        | -59*                     | 21                                                                           | -29                  | 3                                        |
| Current Account Balance 1982                                             | -2                                                    | -16                                                        | -81                      | -3                                                                           | 3                    | 1                                        |
| Percent of Defense Expenditures in<br>Total Government Expenditures 1981 | -7                                                    | 8                                                          | 0                        | 74*                                                                          | 0                    | 0                                        |
| Export Growth 1960-70                                                    | -4                                                    | -1                                                         | 0                        | 69*                                                                          | 4                    | 23                                       |
| Export Growth 1970-82                                                    | -21                                                   | 25                                                         | 24                       | 42*                                                                          | 10                   | -3                                       |
| Public External Debt as % of<br>GDP 1982                                 | 37                                                    | 1                                                          | -23                      | 12                                                                           | 65*                  | -10                                      |
| External Debt Service as % of GDP<br>1982                                | -8                                                    | 35                                                         | -15                      | -18                                                                          | 61*                  | -20                                      |
| Exports as % of GDP 1982                                                 | 7                                                     | -11                                                        | 21                       | 37                                                                           | 55*                  | 22                                       |
| Growth in Private Consumption 1970-82                                    | 21                                                    | 4                                                          | -3                       | 10                                                                           | -4                   | 76*                                      |
| Growth in Imports 1970-82                                                | 43                                                    | 19                                                         | 3                        | 12                                                                           | -21                  | 68*                                      |

Table 38

**Oblique Factor Pattern: Economic Variables, % Defense  
Expenditures In Total Government Budget, Group I  
Countries**

| Variables                                                             | Factors                                            |                                                                               |                                       |                      |                            |                              |
|-----------------------------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------|----------------------|----------------------------|------------------------------|
|                                                                       | 1<br>Factor<br>Explaining<br>Public<br>Consumption | 2<br>Factor<br>Explaining<br>Growth of<br>Military Expend.<br>in Total Budget | 3<br>Service<br>External<br>Debt 1982 | 4<br>Export<br>Ratio | 5<br>External<br>Debt 1982 | 6<br>Growth<br>in<br>Exports |
| Gross Inflow Public Loans as % of GDP 1982                            | 100*                                               | -2                                                                            | 4                                     | -4                   | -7                         | 4                            |
| Public Borrowing Commitments as % of GDP 1982                         | 100*                                               | -3                                                                            | 3                                     | -3                   | -9                         | 1                            |
| Gross Inflow Public Loans as % of GDI 1982                            | 100*                                               | -3                                                                            | 5                                     | 0                    | -9                         | 0                            |
| Public Debt as % Exports 1982                                         | 98*                                                | -3                                                                            | 0                                     | -3                   | -7                         | -2                           |
| Resource Balance 1982                                                 | 95*                                                | -18                                                                           | 20                                    | 6                    | -1                         | -1                           |
| Growth in Public Consumption 1970-82                                  | 93*                                                | -14                                                                           | -6                                    | 0                    | 12                         | 4                            |
| Growth in Imports 1970-82                                             | 80*                                                | 0                                                                             | -19                                   | -4                   | 13                         | 17                           |
| Public Consumption as % of GDP 1982                                   | 77*                                                | 36                                                                            | -6                                    | 28                   | 2                          | -6                           |
| Public Consumption as % of GDP 1970                                   | 74*                                                | 15                                                                            | -9                                    | 18                   | -22                        | -1                           |
| External Public Debt as % of GDP 1982                                 | 71*                                                | 18                                                                            | -9                                    | 11                   | -5                         | -16                          |
| Private Consumption as % of GDP 1982                                  | -70*                                               | 0                                                                             | 0                                     | -32                  | -17                        | -17                          |
| Terms of Trade 1982                                                   | -62*                                               | 3                                                                             | -16                                   | 20                   | 22                         | 13                           |
| Private Consumption as % of GDP 1960                                  | -57*                                               | -7                                                                            | -4                                    | 8                    | 0                          | 0                            |
| Gross International Reserves 1982                                     | 4                                                  | 98*                                                                           | 6                                     | -18                  | -6                         | 22                           |
| Net Inflow Public External Loans 1970                                 | 4                                                  | 35*                                                                           | 5                                     | 10                   | -5                         | -9                           |
| Gross National Product Per Capita 1982                                | -10                                                | 92*                                                                           | -6                                    | 4                    | -12                        | 33                           |
| Percent of Defense Expenditures in Total Government Expenditures 1981 | 3                                                  | 91*                                                                           | -43                                   | -18                  | 1                          | -1                           |
| External Public Debt 1970                                             | 9                                                  | 85*                                                                           | 31                                    | 1                    | -2                         | -12                          |
| External Public Debt 1982                                             | -5                                                 | 82*                                                                           | -14                                   | 8                    | 37                         | -4                           |
| Gross Inflow External Loans 1970                                      | 6                                                  | 81*                                                                           | 35                                    | 10                   | -1                         | 4                            |
| Gross International Reserves 1970                                     | 2                                                  | 74*                                                                           | 26                                    | -15                  | 9                          | 13                           |
| Interest Payments on External Debt 1982                               | -3                                                 | 72*                                                                           | 0                                     | 0                    | 45                         | 2                            |
| Repayment of Principal on Public Loans 1982                           | -1                                                 | 63*                                                                           | 0                                     | 3                    | 60                         | -3                           |
| Gross Inflow Public Loans 1982                                        | 2                                                  | 51*                                                                           | 23                                    | 8                    | 49                         | 0                            |
| Gross Domestic Product 1982                                           | -6                                                 | 41*                                                                           | 29                                    | -41                  | 18                         | -31                          |
| Current Account Balance 1982                                          | -10                                                | -75*                                                                          | -25                                   | 21                   | -3                         | -28                          |
| Current Account Balance 1970                                          | 10                                                 | -89*                                                                          | 40                                    | -10                  | 25                         | 0                            |
| Repayment of Principal on Public External Loans 1970                  | 7                                                  | 12                                                                            | 90*                                   | 4                    | 9                          | 10                           |
| Interest Payments on External Debt 1970                               | 7                                                  | 16                                                                            | 89*                                   | -1                   | 7                          | 0                            |
| Growth of Private Consumption 1970-82                                 | 46                                                 | 5                                                                             | -57*                                  | -5                   | 28                         | 33                           |
| Exports as % of GDP 1982                                              | 0                                                  | 2                                                                             | 15                                    | 88*                  | 16                         | 18                           |
| Public External Debt as % of GDP 1982                                 | 18                                                 | -16                                                                           | 4                                     | 83*                  | 16                         | 1                            |
| Growth in Exports 1960-70                                             | -4                                                 | 9                                                                             | -28                                   | 69*                  | -                          | -17                          |
| External Debt Service as % of Exports 1982                            | -21                                                | 1                                                                             | 1                                     | 14                   | 75*                        | 2                            |
| Public External Borrowing Commitments 1982                            | 5                                                  | 53                                                                            | 22                                    | 3                    | 53*                        | -2                           |
| Growth in Exports 1970-82                                             | -21                                                | 42                                                                            | 38                                    | 30                   | -26                        | 42*                          |
| Average Maturity of External Public Debt 1982                         | 32                                                 | -16                                                                           | -29                                   | 11                   | -22                        | 41*                          |



Table 39

**Oblique Factor Pattern: Economic Variables, % Defense  
Expenditures In Total Government Budget, Group II  
Countries**

| Variables                                                                | Factors                                                |                                                            |                                                                  |                              |                                                                                |
|--------------------------------------------------------------------------|--------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------------------|------------------------------|--------------------------------------------------------------------------------|
|                                                                          | 1<br>Factor<br>Influencing<br>Total Exter-<br>nal Debt | 2<br>Determinants<br>of Growth<br>in Public<br>Consumption | 3<br>Factors<br>Influencing<br>Share of<br>Public<br>Consumption | 4<br>Growth<br>in<br>Imports | 5<br>Factors<br>Influencing<br>Share of<br>Military Expend.<br>in Govt. Budget |
| External Public Debt 1982                                                | 99*                                                    | 2                                                          | -5                                                               | 7                            | -4                                                                             |
| Gross Inflow Public Loans 1982                                           | 96*                                                    | 5                                                          | 8                                                                | 18                           | -8                                                                             |
| Interest Payments on External<br>Public Debt 1982                        | 94*                                                    | -3                                                         | 11                                                               | 10                           | -16                                                                            |
| Repayment of Principal on Public<br>External Loans 1970                  | 92*                                                    | -11                                                        | 2                                                                | 23                           | -3                                                                             |
| Public External Borrowing Commit-<br>ments 1982                          | 92*                                                    | 12                                                         | -9                                                               | 35                           | -13                                                                            |
| Repayment of Principal on Public<br>External Loans 1982                  | 87*                                                    | -5                                                         | -1                                                               | -39                          | 14                                                                             |
| Debt Service on Public External<br>Debt as % of Exports 1982             | 84*                                                    | -7                                                         | 28                                                               | -18                          | -12                                                                            |
| Interest Payments on External Public<br>Debt 1970                        | 84*                                                    | -3                                                         | -18                                                              | -34                          | 4                                                                              |
| Gross Inflow Public Loans 1970                                           | 79*                                                    | 0                                                          | -39                                                              | -9                           | 15                                                                             |
| Resource Balance as % of GDP 1982                                        | 69*                                                    | -51                                                        | -6                                                               | -15                          | 1                                                                              |
| Gross Inflow Public Loans as %<br>of Exports 1982                        | 67*                                                    | 56                                                         | 24                                                               | -29                          | -15                                                                            |
| Terms of Trade 1982                                                      | 66*                                                    | -48                                                        | -31                                                              | 41                           | -16                                                                            |
| Current Account Balance 1970                                             | -28*                                                   | -7                                                         | 11                                                               | -10                          | -19                                                                            |
| Public Borrowing Commitments as<br>% of Exports 1982                     | 5                                                      | 92*                                                        | -6                                                               | -7                           | -24                                                                            |
| Average Maturity of Public External<br>Debt 1982                         | -31                                                    | 87*                                                        | -15                                                              | -6                           | 3                                                                              |
| Current Account Balance 1982                                             | -16                                                    | 80*                                                        | -16                                                              | 26                           | 0                                                                              |
| Average Annual Growth in Public<br>Consumption 1970-82                   | -7                                                     | 71*                                                        | -2                                                               | 61                           | -10                                                                            |
| Public External Debt as % of Exports<br>1982                             | 51                                                     | 54*                                                        | -6                                                               | -47                          | -9                                                                             |
| Gross International Reserves 1982                                        | -25                                                    | -73*                                                       | -40                                                              | 9                            | -21                                                                            |
| Gross International Reserves 1970                                        | -9                                                     | -83*                                                       | -20                                                              | -26                          | 0                                                                              |
| Gross National Product per Capital<br>1982                               | -5                                                     | -83*                                                       | 8                                                                | -5                           | -19                                                                            |
| Gross Inflow Public Loans as %<br>Exports 1982                           | 38                                                     | 11                                                         | 72*                                                              | 30                           | 10                                                                             |
| Public External Debt as % of GDP<br>1982                                 | 64                                                     | 15                                                         | 66*                                                              | 12                           | 15                                                                             |
| Public Consumption as % of GDP 1982                                      | -22                                                    | 2                                                          | 65*                                                              | -10                          | -1                                                                             |
| Exports as % of GDP 1982                                                 | -4                                                     | -24                                                        | 62*                                                              | 49                           | 28                                                                             |
| Gross Domestic Product 1982                                              | 42                                                     | -49                                                        | -55*                                                             | -13                          | -4                                                                             |
| External Public Debt 1982                                                | 49                                                     | -7                                                         | -57*                                                             | -15                          | 17                                                                             |
| Private Consumption as % GDP 1982                                        | -44                                                    | 45                                                         | -62*                                                             | 1                            | -3                                                                             |
| Net Inflow Public External Loans 1970                                    | 57                                                     | 6                                                          | -64*                                                             | 17                           | 13                                                                             |
| Growth in Private Consumption 1970-82                                    | 17                                                     | -1                                                         | 13                                                               | 88*                          | -14                                                                            |
| Growth in Imports 1970-82                                                | 10                                                     | 37                                                         | -3                                                               | 80*                          | -13                                                                            |
| Public Consumption as % of GDP 1982                                      | -16                                                    | -3                                                         | 23                                                               | 66*                          | 26                                                                             |
| Public External Loans as % GDP 1970                                      | 39                                                     | 9                                                          | -24                                                              | 55*                          | 38                                                                             |
| Percent of Defense Expenditures in<br>Total Government Expenditures 1981 | -13                                                    | 14                                                         | 5                                                                | 7                            | 89*                                                                            |
| Growth in Exports 1970-82                                                | 12                                                     | -14                                                        | 8                                                                | -21                          | 83*                                                                            |
| Growth in Exports 1960-70                                                | -17                                                    | -2                                                         | 6                                                                | 12                           | 75*                                                                            |
| Private Consumption % of GDP 1960                                        | 3                                                      | 48                                                         | -37                                                              | -8                           | 54*                                                                            |

Table 40

Determininants Of The Share Of Military Expenditures  
In Government Budgets, Total Sample

(Standardized Estimates)

| Equation | Independent Variables |                |                  |                  |                  |                | Statistics     |       |    |
|----------|-----------------------|----------------|------------------|------------------|------------------|----------------|----------------|-------|----|
|          | GEDA                  | RDTB           | PDB              | GETYB            | GEGB             | YPRS           | r <sup>2</sup> | F     | DF |
| 1 GEDB=  | 0.87<br>(8.98)        |                |                  |                  |                  |                | .763           | 80.71 | 26 |
| 2        | 0.90<br>(9.86)        | 0.20<br>(2.21) |                  |                  |                  |                | .803           | 49.03 | 26 |
| 3        | 0.90<br>(10.07)       | 0.20<br>(2.33) | -0.13<br>(-1.50) |                  |                  |                | .821           | 35.12 | 26 |
| 4        | 0.85<br>(5.60)        |                |                  | -0.16<br>(-1.04) |                  |                | .635           | 16.58 | 21 |
| 5        | 0.91<br>(10.45)       | 0.20<br>(2.35) |                  |                  | -0.15<br>(-1.94) |                | .828           | 37.01 | 26 |
| 6        | 0.89<br>(9.73)        |                |                  |                  |                  | 0.19<br>(2.06) | .799           | 47.69 | 26 |
| 7        | 0.91<br>(10.52)       |                |                  |                  | -0.19<br>(-2.07) | 0.21<br>(2.42) | .830           | 37.56 | 26 |

Notes: See text for definition of variables

( ) = t statistic

r<sup>2</sup> = correlation coefficient

F = F statistic

DF = degrees of freedom

A comparison of the actual versus the predicted values in Table 41 is somewhat disappointing. Venezuela's actual value is only 70 percent of the predicted value.

The step wise regression for group I countries, Table 42, indicates there are two variables of significance in determining the share of military expenditures in the total government budget. These variables are the share of the military expenditures in the total government budget for 1971 (GEDA) and other government expenditures as a percentage of the total government budget (GEOB). These variables account for 76 percent of the observed fluctuations in military expenditures.

Two sets of regressions were performed on the group II countries in an attempt to see if factors that affect the share of military expenditures in the total government budget of Venezuela can be predicted without the use of past shares of the budget. The first set, equations 1 through 4 on Table 43 contain the 1971 share of military expenditures in the total government budget (GEDA) while the second set, equation 5 on Table 43 does not.

With regard to the first set, past shares of government expenditures allocated to defense (GEDA) together with the share of total government expenditures in gross national product (GETYB) and the share of private consumption in gross domestic product account for around 93 percent of the fluctuations in the defense expenditures share of the budget.

Table 41

Share Of Military Expenditures In  
Government Budgets, Total Sample

| Country         | Actual | Predicted | Actual/<br>Predicted | Placement |
|-----------------|--------|-----------|----------------------|-----------|
| 1. Ghana        | 3.700  | 9.678     | .3823                | Below     |
| 2. Brazil       | 3.400  | 8.818     | .3856                | Below     |
| 3. Costa Rica   | 2.600  | 6.321     | .4113                | Below     |
| 4. Mexico       | 2.500  | 5.290     | .4726                | Below     |
| 5. Sudan        | 13.200 | 22.183    | .5951                | Below     |
| 6. Venezuela    | 3.900  | 5.535     | .7046                | Below     |
| 7. Tanzania     | 11.200 | 14.832    | .7551                | Below     |
| 8. Spain        | 4.400  | 5.588     | .7874                | Below     |
| 9. Paraguay     | 13.200 | 15.592    | .8466                | Below     |
| 10. Malaysia    | 15.100 | 17.760    | .8502                | Below     |
| 11. Thailand    | 20.600 | 23.875    | .8628                | Below     |
| 12. Philippines | 14.200 | 16.068    | .8837                | Below     |
| 13. Tunisia     | 8.300  | 9.280     | .8944                | Below     |
| 14. Syria       | 37.700 | 41.718    | .9037                | Below     |
| 15. Kuwait      | 9.800  | 9.776     | 1.0025               |           |
| 16. Chile       | 12.000 | 11.632    | 1.0316               |           |
| 17. Israel      | 39.800 | 37.896    | 1.0505               | Above     |
| 18. Uruguay     | 12.900 | 11.507    | 1.1211               | Above     |
| 19. Bolivia     | 22.700 | 19.456    | 1.2300               | Above     |
| 20. Korea       | 35.200 | 28.745    | 1.2418               | Above     |
| 21. Argentina   | 11.400 | 9.134     | 1.2481               | Above     |
| 22. Uganda      | 34.500 | 27.321    | 1.2628               | Above     |
| 23. Peru        | 13.800 | 10.800    | 1.2778               | Above     |
| 24. Kenya       | 10.700 | 7.537     | 1.4197               | Above     |
| 25. Morocco     | 16.200 | 10.692    | 1.5152               | Above     |
| 26. Malawi      | 8.400  | 5.532     | 1.5184               | Above     |
| 27. El Salvador | 16.800 | 7.043     | 2.3853               | Above     |

## Notes:

Based on regression equation:

$$\text{GEDE} = 0.92\text{GEDEA} - 0.18\text{GEDEB} + 0.21\text{YPRS}$$

(10.52)    (-2.06)    (2.42)

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

Table 42

Determinants Of The Share Of Military Expenditures  
In Government Budgets, Group I Countries

(Standardized Estimates)

| Equation | Independent Variables |                  |                | Statistics     |       |    |
|----------|-----------------------|------------------|----------------|----------------|-------|----|
|          | GEDA                  | GEGB             | RDTB           | r <sup>2</sup> | F     | DF |
| 1 GEGB=  | 0.84<br>(5.73)        |                  |                | .701           | 32.82 | 15 |
| 2        | 0.91<br>(6.55)        | -0.27<br>(-1.93) |                | .767           | 21.49 | 15 |
| 3        | 0.96<br>(6.73)        | -0.29<br>(-2.01) | 0.16<br>(1.17) | .792           | 15.19 | 15 |

Notes: See text for definition of variables

( ) = t statistic

r<sup>2</sup> = correlation coefficient

F = F statistic

DF = degrees of freedom

Table 43

Determinants Of The Share Of Military Expenditures  
In Government Budgets, Group II Countries

(Standardized Estimates)

| Equation | Independent Variables |                  |                  |                |                  |                  |                |                | Statistics     |       |    |
|----------|-----------------------|------------------|------------------|----------------|------------------|------------------|----------------|----------------|----------------|-------|----|
|          | GEDA                  | GETYB            | PRB              | SSPB           | PDB              | DSGA             | PDPA           | RDTB           | r <sup>2</sup> | F     | DF |
| 1        | GEDB= 0.94<br>(9.56)  |                  |                  |                |                  |                  |                |                | .890           | 73.41 | 10 |
| 2        | 1.04<br>(10.24)       | -0.23<br>(-2.25) |                  |                |                  |                  |                |                | .933           | 55.86 | 10 |
| 3        | 0.89<br>(8.53)        | -0.36<br>(-2.85) | -0.25<br>(-1.99) |                |                  |                  |                |                | .935           | 29.08 | 9  |
| 4        | 0.89<br>(15.73)       | -0.33<br>(-4.79) | -0.17<br>(-2.39) | 0.23<br>(3.91) |                  |                  |                |                | .994           | 77.76 | 9  |
| 5        |                       |                  |                  |                | -0.45<br>(-3.49) | -0.53<br>(-3.51) | 0.53<br>(3.84) | 0.68<br>(4.92) | .857           | 15.04 | 14 |

Notes: See text for definition of variables

( ) = t statistic

r<sup>2</sup> = correlation coefficient

F = F statistic

DF = degrees of freedom

Equation 5 indicates that over 85 percent of the fluctuations in the defense expenditures share of the total government budget for 1981 can be accounted for without resorting to the use of past budget shares. The variables that are statistically significant are: (1) the external debt in 1982 (PDB); (2) the debt service to gross domestic product in 1970 (DSGA); (3) the total external debt as a percentage of gross domestic product in 1970 (PDPA); and (4) the central government domestic taxes as a percentage of total revenues.

This would lend evidence to the theory that one can predict the fluctuations in the defense expenditures share of the total government budget without using past shares of the budget as a variable, although the results would not be as good as if past shares were included.

A comparison of actual versus predicted values in Table 44 shows that the predicted value for Venezuela is approximately 12 percent greater than the actual value.

In summary, the basic regression equation for the share of military expenditures in the total government budget is shown in Figure 14.



Table 44

Share Of Military Expenditures In Government  
Budgets, Group II Countries

| Country           | Actual | Predicted | Actual/<br>Predicted | Placement |
|-------------------|--------|-----------|----------------------|-----------|
| 1. Costa Rica     | 2,600  | 5.941     | .4376                | Below     |
| 2. Dominican Rep. | 9,900  | 14.341    | .6206                | Below     |
| 3. Trinidad       | 2,000  | 2.907     | .6880                | Below     |
| 4. Brazil         | 3,400  | 4.454     | .7634                | Below     |
| 5. Chile          | 12,000 | 13.538    | .8864                | Below     |
| 6. Bolivia        | 22,700 | 22.371    | 1.0147               |           |
| 7. Argentina      | 11,400 | 11.062    | 1.0306               |           |
| 8. Nicaragua      | 11,000 | 10.475    | 1.0501               | Above     |
| 9. Peru           | 13,800 | 12.873    | 1.0720               | Above     |
| 10. Uruguay       | 12,000 | 11.992    | 1.0757               | Above     |
| 11. El Salvador   | 16,800 | 15.225    | 1.1034               | Above     |
| 12. Venezuela     | 3,900  | 3.457     | 1.1281               | Above     |
| 13. Ecuador       | 11,900 | 9.292     | 1.2700               | Above     |
| 14. Paraguay      | 13,200 | 9.265     | 1.4247               | Above     |
| 15. Mexico        | 2,500  | 1.705     | 1.4663               | Above     |

## Notes:

Based on regression equation:

$$3EDB = -0.46PDB - 0.53DSGA + 0.53PDPA + 0.69RDTB$$

$$(-3.49) \quad (-3.51) \quad (3.94) \quad (4.93)$$

Below = Countries whose Actual is less than 95% of Predicted value

Above = Countries whose Actual is greater than 105% of Predicted value

---

|          | GEDA | RDTB | GETYB | GEQB | PDB | PDPA |
|----------|------|------|-------|------|-----|------|
| <hr/>    |      |      |       |      |     |      |
| Total    | +    | +    | 0     | -    | 0   | 0    |
| Group I  | +    | 0    | 0     | -    | 0   | 0    |
| Group II | +    | +    | -     | 0    | -   | +    |

---

Figure 14 - Summary Of Regression Equation For The Share Of Military Expenditures In The Total Government Budget

Notes: + = Statistically Significant With A Positive Sign At The 95% Level  
 - = Statistically Significant With A Negative Sign At The 95% Level  
 0 = Statistically Insignificant

## V. CONCLUSION

The analysis of the various measures of military expenditures has shown several significant patterns. Most of the observed differences in military expenditures can be explained exclusively with economic variables. Analysis of the patterns of military expenditures for developing countries, as a total country sample, does not produce as clear a pattern as that obtained from analyzing countries in separate groups based on economic environments. As shown in Table 20, Venezuelan defense spending can be accurately predicted with the use of economic variables.

With this in mind, the analysis has demonstrated that Venezuelan military expenditures are not typical when compared to less developed countries as a whole. However, grouping Venezuela in a sample of countries, experiencing a similar economic environment, produces results that indicate Venezuela's military expenditures are largely functions of that environment. They are also typical of countries experiencing similar structural economic constraints.

## LIST OF REFERENCES

1. Betancourt, R., and Bauman, E., Venezuela: Oil and Politics, Houghton Mifflin Company, 1979.
2. Macdonald, A.F., Latin American Politics and Government, Thomas Y. Cromell Company, 1948.
3. Informe de la Comision de Formento al Congreso Nacional no. 18, Caracas, 1948.
4. International Labor Office, Liberty Of Association And Working Conditions In Venezuela, Geneva, 1949.
5. Central Bank Of Venezuela, Central Bank Of Venezuela Annual Report For 1948, Venezuela, 1949.
6. Cuadernos de Informacion Economica Venezolano, Venezuela, 1945.
7. Cuadernos de Informacion Economica Venezolano, Venezuela, 1950.
8. The Economist of London, London, Dec 11, 1952.
9. The New York Times, New York, Dec 4, 1952.
10. Central Bank Of Venezuela, Central Bank Of Venezuela Annual Report For 1953, Venezuela, 1954.
11. Costezano, V. and Casado, E.R., Venezuelan Education La Esfera Newspaper, Caracas, 1954.
12. Instituto Interamericano de Estadistica, America en Cifras, 1974.
13. Instituto Interamericano de Estadistica, America en Cifras, 1974.
14. Furtado, C., Economic Development Of Latin America, Cambridge University Press, 1976.
15. Martin, A. and Lewis, W.A., Patterns of Public Revenue and Expenditure, Manchester School, 1956.
16. Wagner, C.A., Finanzwissenschaft, 1980.
17. Lotz, J.R., Patterns of Government Spending in Developing Countries, Manchester School, 1970.

18. Whynes, D., The Economics of Third World Military Expenditures, University of Texas Press, 1979.
19. The World Bank, World Development Report 1984, Oxford University Press, 1984.
20. Heller, W., Taxes and Fiscal Policy in Under Developed Countries, United Nations Technical Assistance Administration, 1969.
21. World Bank Statistical Supplement, World Development Report for 1984, Oxford University Press, 1984.
22. The International Monetary Fund, Government Finance Statistics Yearbook 1983, 1983.
23. Taylor, C. and Jodice, D., World Handbook of Political and Social Indicators, Yale University Press, 1983.
24. World Military Expenditures and Arms Transfers 1975 - 1982, U.S. Arms Control and Disarmament Agency, 1984.
25. Rummel, R.J., Applied Factor Analysis, Northwestern University Press, 1970.
26. O'Leary, M.K. and Coplin, W., Explaining Military Expenditures in Latin America, 1974.
27. Frederiksen, P.C. and Looney, R.E., "Defense Expenditures and Economic Growth in Developing Countries: Some Further Empirical Evidence," Journal Of Economic Development, July, 1982.

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